

The ANNUAL MEETING of the Society for American Archaeology provides a forum for the dissemination of knowledge and discussion. The views expressed at the sessions are solely those of the speakers and the Society does not endorse, approve, or censor them. Descriptions of events and titles are those of the organizers, not the Society.

SYMPOSIUM ABSTRACTS

[1] Forum · PRESIDENT'S FORUM: CLIMATE CHANGE, ARCHAEOLOGY, AND COMMUNITY ENGAGEMENTS

Global climate is affecting archaeological sites and heritage at a scale and rate unprecedented in the experience of archaeologists over the last 150 years. Coping with sea-level rise, increasingly frequent wildfires, severe storms, and other climate change impacts requires approaches beyond those typical of heritage management over the last 40 years. One innovative approach is engaging local communities to protect threatened properties and to do in-depth documentation of those that will be lost. Some initiatives have given extraordinary levels of training and empowerment to local communities. This forum showcases successful approaches in a variety of global settings.

[2] Symposium · WHEN DISASTER STRIKES: ENVIRONMENTAL IMPACTS ON COLLECTIONS PRESERVATION

(SPONSORED BY SAA MUSEUMS, COLLECTIONS, AND CURATION COMMITTEE AND SAA CLIMATE CHANGE STRATEGIES AND ARCHAEOLOGICAL RESOURCES)

Cultural heritage collections are threatened resources. Climate change exacerbates physical risk posed by insufficient facilities and infrastructure. Many museums, repositories, and collections facilities worldwide are ill-equipped to handle increased frequency of natural disasters exemplified by recent flooding in Louisiana, wildfires in California and Arizona, Super Storm Sandy, and Hurricane Katrina. New collections of fragile, perishable, and organic materials rescued from sites facing imminent destruction encounter poor refuge in overburdened, vulnerable facilities. While collections may be "saved" via excavation, future research, education, and public outreach remain imperiled if the facilities to house these new collections are substandard. Most repositories are inadequately prepared for and therefore susceptible to the gamut of natural disasters. Confronting these challenges offers the opportunity to develop collaborative solutions that will not only benefit heritage preservation across the world, but also enrich research relevant to that changing world. This symposium brings together international experience and expertise focused on more effective planning for response to climate threats and the preservation challenges they pose.

[3] General Session · OLMEC ARCHAEOLOGY

[4] Electronic Symposium · DEVELOPING APPROACHES IN THE STUDY OF PREHISTORIC COPPER IN NORTH AMERICAN ARCHAEOLOGY

From studies at the turn of the twentieth century using assay techniques demonstrating that copper was of New World origins rather than Old, to typological studies and metallurgical studies in the mid to late twentieth century, to the sophisticated elemental analyses of the early twenty-first, analysis of prehistoric copper materials has been an active area of research throughout the development of American archaeology. Unlike the rich theoretical and methodological approaches used in other material analyses involving lithics and ceramics, copper analysis trends toward the idiosyncratic, the under problematized, and the under theorized. Yet research involving prehistoric copper has recently experienced a notable growth, and from this growth there have emerged new approaches, questions, and social issues that may be addressed using copper. Among these remain the traditional provenance studies, but research has expanded or is expanding into social processes, dynamic interactions between communities, studies of ritual economies, issues of copper technological organization and production, and others. This session highlights this growing body of research and methodologies and begins to explore the range of methods, problems, and theory that may support the future development of copper studies in North American archaeology.

[5] Electronic Symposium · THE SOCIAL USES OF FOOD IN ANCIENT MAYA CULTURE

From feasting as a mechanism for the evolution of complexity to the competitive trade in cacao beans among elites, food and cuisine were deployed in a myriad of ways to cement social relations and reinforce specific identities in the ancient Maya world. The study of foodways encompasses not only diet but all the cultural behaviors and beliefs surrounding consumption—ritual offerings and restrictions, medicinal preparations, competitive consumption, and the role of nostalgia or memory around food. This session presents a series of case studies of Classic Maya foodways from Preclassic to Postclassic contexts. From this rich foundation we will move beyond specific examples to a more comprehensive understanding of the mechanisms by which food was instrumental to the development of ancient Maya culture. How was diet codified as a marker of Maya identity? Which foods emerged as key components of state ritual and how was their production manipulated? In what ways did cuisine become a specialized knowledge base that reinforced hierarchy? Papers will address the ideological as well as nutritional aspects of Maya cuisine, the economic or political significance of shared foodways, and the role of foodstuffs in the dynamic processes of identity formation.

[6] Forum · ADVANCEMENTS AND PROSPECTS IN GEOARCHAEOLOGY TODAY: THE SAA GIG AT 20, PART 1

(SPONSORED BY GEOARCHAEOLOGY INTEREST GROUP)

In celebration of 20 years of the Geoarchaeology Interest Group (GIG) in the Society for American Archaeology, we seek to clarify the present and future contributions of geoarchaeology, in terms of practical techniques, analytic and interpretive methods, and theoretical approaches. Whether as its own field or hybridized multidisciplinary endeavor, geoarchaeology has grown over the last decades to encompass a multitude of research themes and operational procedures, but what unifies this diversity under the name of geoarchaeology? Furthermore, what are the current and emerging new challenges for practicing geoarchaeologists as relevant for today's concerns of sustainable development, values of landscapes as heritage resources, and the place of human societies within a changing environment?

[7] Poster Session · CURRENT RESEARCH IN MESOAMERICA I**[8] Poster Session · BIOARCHAEOLOGY IN MESOAMERICA****[9] Poster Session · CURRENT RESEARCH IN MESOAMERICA II****[10] Poster Session · PROCESOS POLÍTICO-ECONÓMICOS DE LA COSTA DEL GOLFO MESOAMERICANA**

Este simposio pretende integrar visualmente algunos de los trabajos arqueológicos relacionados con los procesos económicos y políticos que se llevaron a cabo en el área de la Costa del Golfo de Mesoamérica, abarcando diferentes etapas y regiones.

[11] Poster Session · ONGOING RESEARCH IN THE THREE RIVERS AREA OF THE SOUTHERN MAYA LOWLANDS

Since being defined more than two decades ago, the Three Rivers Region of the southern Maya Lowlands has been intensively studied by a number of researchers. The area includes the Department of Petén, Guatemala, and the adjoining northwestern portion of Belize, and is within the Rio Azul, Rio Bravo, and Booth's Rivers that converge to form the Rio Hondo. The Three Rivers Region includes the well-known sites of La Milpa, Blue Creek, and Rio Azul. This poster symposium will present recent work from the region.

[12] Poster Session · NEW RESEARCH IN WEST MEXICO: STATE OF MICHOACÁN

The western Mexican state of Michoacán extends from the Pacific coast, includes parts of the Sierra Madre Occidental, and stretches north to the Lerma River. This region has a long cultural occupation and, by the end of the Postclassic, it fell within the Tarascan Señorío, a powerful rival of the Aztec empire. Tarascans are known to have an isolate language, being prolific traders, excellent coppersmiths, and, in comparison to their neighbors, had a very distinct culture. In 2014, Dr. Jose Luis Punzo-Díaz launched Proyecto Arqueología y Paisaje del Area Centro Sur de Michoacán, which includes sites located near Lake Zirahuén and north of the Balsas River basin. Since then he and his team have intensively investigated a number of archaeological sites, which have added to the body of knowledge of this unique culture. This poster session attempts to bring together a cross-section of the most recent work.

[13] Symposium · ALTICA: THE MILLENNIUM BEFORE TEOTIHUACAN

One of the big questions for archaeology is the origins of complex societies. Although one of the largest and most influential cities and states, Teotihuacan, developed in the northeastern Basin of Mexico, there has been little research in recent decades about the Formative period before the rise of Teotihuacan. The Altica Project that began in 2014 is an important step in addressing the limited problem-oriented research at Formative sites in the Basin of Mexico for over two decades. Altica is the earliest-known settled village in the Teotihuacan Valley and one of the only first-farming village sites in the Basin of Mexico that has not been engulfed by the urban sprawl of Mexico City. Despite its small size and remote location, Altica was an important piece in Early and Middle Formative exchange networks as it played a role in the early trade of Otumba obsidian and imported other goods from distant places in Mesoamerica. Papers in this session present findings from excavations and surveys at the site and studies of its artifacts and features. Contributors discuss topics ranging from diet, exchange/procurement networks focused on obsidian and ceramics, tool technologies, and the cultural and biological identities of its inhabitants.

[14] Symposium · FORENSIC ARCHAEOLOGY

This session aims to highlight recent projects from those active in forensic research and case work. As forensic archaeology continues to grow as a discipline and is utilized with increasing frequency by law enforcement officials, case studies are of great use to those engaged in forensic field work. In addition, research is essential to strengthening the theoretical foundations of forensic archaeology. This session also features research projects that will be of benefit to future forensic work and criminal justice. Those involved in research have the opportunity to address areas untouched by current practitioners. By bringing together researchers and practitioners, this symposium aims to create meaningful dialog and spur collaboration.

[15] Symposium · THE VIKING PHENOMENON

In December 2015, the Swedish Research Council made an unprecedented investment in archaeology with a ten-year, multimillion dollar grant to establish a center of excellence in Viking Studies at Uppsala University. Much of the recent research into the Vikings and their time (c. 750–1050 CE) has focused on the complex processes of state formation and Christian conversion that eventually gave rise to the modern Scandinavian nations. Far less attention has been devoted to the very beginnings of this trajectory: who really were the Viking raiders in a specific sense, why did they do what they do, what kind of societies produced them, and why did they start to expand so violently at precisely this time? The answers to these questions concern the very origins of the Viking phenomenon, and our focus is thus on the critical period 750–850 CE and the decades either side. This session presents a range of ongoing archaeological work within the project: issues central to our understanding of how Scandinavia came to be what it is today, and the sometimes problematic ways in which this knowledge of the Viking-Age past is received in contemporary society.

[16] Symposium · PERSON, PLACE, OR THING: ONGOING QUESTIONS AND EVIDENCE FOR NEW ENGLAND SETTLEMENT AND MATERIAL CULTURE

The various investigations at New England archaeological sites presented in this session have yielded new information to help address old questions. Settlement patterns and artifact typologies have long been the basic contextual foundation for interpreting cultural change. These investigations provide new insights that expand on New England's cultural history.

[17] General Session · INDIGENOUS ARCHAEOLOGIES**[18] Symposium · METHODS AND MODELS FOR TEACHING DIGITAL ARCHAEOLOGY AND HERITAGE**

As the role that digital methods play in heritage and archaeology has increased in importance, so has the challenge of teaching those digital methods. Who should be taught digital methods? Should undergraduate and grad students be taught digital methods alongside non-digital methods? Should instruction in digital methods be curricular or extracurricular? Should instruction in digital methods take place in the classroom, the lab, or in the field? How should existing scholars or professionals be taught digital methods? What concepts, platforms, or technologies should be taught? What underlying values about the application of digital methods in archaeology and heritage should be expressed in teaching programs? All are relevant questions whose answer requires measured design, careful planning, and thoughtful implementation. The purpose of this session is to explore these critical issues by highlighting a series of case studies, each of which approaches the challenge of teaching digital methods within archaeology and heritage differently. Beyond the case studies themselves, the session hopes to highlight generalizable models that might be adapted and adopted in a wide variety of institutional, professional, or scholarly settings.

[19] Symposium · CONSTRUCTING ARCHAEOLOGY: MOVING SEX/GENDER AND SEXUALITY RESEARCH FROM THE PERIPHERY TO THE CENTER

The majority of archaeological projects neglect sex/gender and sexuality research due to a social construction within our community that relegates these topics to the periphery of archaeological discourse. This session aims to move sex/gender and sexuality studies from the periphery to the center by examining the implementation of such research in a variety of archaeological projects with differing regional foci and research goals. The papers in this session impress upon the archaeological community that such lines of inquiry should be routine in classroom instruction, field work, and lab analysis. The research presented addresses new theoretical engagements, methodological approaches, and interdisciplinary work that allow for a practical approach to the investigation of sex/gender and sexuality constructs in past communities. The diverse approaches illustrate that sex/gender and sexuality is still, and will remain, an important topic that anyone studying the past should, at the very least, consider.

[20] Symposium · CITIES, LARGE VILLAGES, OR NEITHER? THE CONUNDRUM OF “MEGASITES” IN PREHISTORY

“Giant” settlements, or “megasites” were a periodic feature of human settlement history from around 4000 BCE right up to the nineteenth century CE. Such sites are usually characterized as “urban,” “pre-urban,” or “proto-urban,” but urbanism has become an exceedingly plastic categorization with a rather nebulous definition. Furthermore, these sites appear to share behavior which is quite different to that of classic urban sites, challenging our assumptions about how such settlements should be classified. A session at the SAA conference in 2013 explored the characteristics of some prominent examples of these settlements, including the European Iron Age Oppida, Cahokia and Great Zimbabwe. This session is designed to revisit and deepen that discussion by considering new research in those regions and bring together new ideas and data that have emerged in the past four years. A consideration of these settlements in this context has the potential to provide significant new insight into the structure and organization of human settlement behavior in prehistory.

[21] Symposium · SOME LIKE IT HOT: ANALYTIC DIVERSITY AND COMPLEMENTARITY IN THE EXPLORATION OF PAST COOKING AND CUISINE

Diet and subsistence are established avenues of archaeological inquiry. The last decade, however, has witnessed greater attention afforded to the cooking techniques employed by past societies. Cooking, a crucial component of cuisine, lies at the intersection of adaptive and social behaviors, allowing for insight into both decisions about nutritional enhancement of foods and the constraints placed on cooking practices by cultural factors, such as identity and ideology. Globally, a diversity of methods is being employed by archaeologists to explore various aspects of past cooking habits, each yielding unique but often complementary data. This symposium explores the types of information yielded by different analytic methods and thereby initiates a dialogue among researchers about how these methods might be used in tandem to create richer and more complete interpretations about past cooking behaviors.

[22] Symposium · FOUNDATIONS FOR INNOVATION: THE LEGACIES AND INFLUENCES OF ARCHAEOLOGICAL SCIENCE AT MCMASTER

McMaster University has a long history in archaeological science, including major advances in stable isotope analysis, provenience studies, and long-term human-environmental interactions. Interdisciplinary research programs have included the pioneering work of Henry Schwarcz in using stable isotope geochemistry for paleo-climate and paleo-diet research, and the materials characterization research of Ron Hancock at the McMaster Nuclear Reactor. Ongoing research and student training now take place within a wide range of specialized archaeological laboratories, established with the support of the Canada Foundation for Innovation. Students are trained at labs focusing on stable isotopes, XRF, ceramic petrography, fisheries, ancient DNA, paleoethnobotany, sediment cores, and in a larger research repository for Ontario archaeological materials. These laboratories have catalyzed research programs across Canada and globally, and are examples of the rapidly evolving state of archaeological science at McMaster as well as ongoing collaborations between institutions. In this session, current researchers and alumni will draw on a wide range of case studies to explore the history of archaeological science at McMaster, the innovative archaeometric and bioarchaeological studies emerging from McMaster laboratories, the application of these studies to diverse social questions, and the state of ongoing collaborative research across the broader landscape of archaeological science.

[23] Symposium · A TASTE FOR GREEN: AN AMERICAN/EUROPEAN PERSPECTIVE ON ANCIENT JADE, TURQUOISE, AND VARISCITE EXCHANGE

Often along vast expanses, ancient societies traded certain commodities that were considered valuable either for functional or symbolic reasons, or rather, a combination of both factors. We shall address the state of the art with regard to the acquisition of jade, turquoise, or variscite, all of which share a characteristic greenish color and engaging appearance. We wish to explore how, in

addition to constituting economic transactions, the transfers of these materials were also statements of social liaisons, personal capacities, or relationships to places or unseen forces. We are centering on two study areas, Western Europe and Mexico/Southwest United States, which are far apart not just in geographical terms but also regarding their chronology and socioeconomic features. While some North and Mesoamerican groups range from relatively complex farming societies to state-like organizations during the first and second millennia AD, their European counterparts are comparatively simpler polities spanning the fifth–third millennia BC. By contrasting the archaeological evidence from diverse areas we may gain insight into the role that production and movement of green stones played in their respective political and ritual economies. Also, we think it useful to compare scientific approaches applied to this question in different parts of the globe.

[24] Symposium · ISLAND ARCHAEOLOGY IN EAST ASIAN PERSPECTIVES

Islands have intrigued archaeologists in their distinctive cultural trajectories and human-environmental dynamics that have still impact on modern times. Islands can provide unique insights into several anthropological questions, including peopling, island adaptations, landscape modifications, isolations and connections over the oceans, and more. Research on islands' past in East Asia has tuned into a regional focus, rather than a broad comparative perspective that can resonate globally. A main goal of our symposium is to create a synergy through discourse on differences and similarities in sociocultural, environmental trajectories in several islands during the Anthropocene. Research areas in focus include islands spotted in the Yellow Sea, East China Sea, and East Sea (Sea of Japan).

[25] Symposium · MEDIEVAL CITIES IN THE EURASIAN STEPPE

The Eurasian steppe is the iconic territory of mobile populations. However, through much of recorded history the region has also seen the development of a long-term tradition of immobile urban inhabitation that has been an integral part of its mobile societies. Broadly, this session will address historical archaeology in Asia, the malleability of ecological and economic frontiers, hybridity and adaptation, urban settlement, and political landscapes. Specifically, we will offer detailed, data-rich challenges to the long-held dichotomy between mobile and immobile populations and the asymmetric and hidebound models of relations between them. Presenters will discuss topics including urban forms and styles of the Eurasian steppes, networks of interaction and exchange, and communities linking immobile cities to mobile agents, the biographies of individuals living in and managing polities and economies, and the dynamics of political landscapes within and around urban centers. This symposium will be not only valuable to specialists, but also present challenges and novel approaches—methodological and theoretical—to the archaeology of borderlands and unsung urban settings worldwide.

[26] Symposium · CULTURAL CONTACTS ALONG THE SILK ROAD DURING THE EARLY BRONZE AGE

It is likely that the Silk Road has played a significant role even before Han Dynasty. The cultural contacts between China and Central Asia can be traced back to the early Bronze Age. The early interaction and integration of Eastern and Western cultures may also occur in this time period. The migration and exchanges of different groups and different cultures were affected the formation of Chinese civilization with diversity characteristics. The geographic areas discussed in the session mainly cover the Northwest Zone, especially Xinjiang, Gansu, Ningxia, Qinghai, Western Shaanxi and Western Inner Mongolia, central Asia. The highlights of the discussed time period include the late Neolithic to Bronze Age.

[27] Symposium · 2017 FRYXELL AWARD SYMPOSIUM: PAPERS IN HONOR OF NAOMI F. MILLER

(SPONSORED BY FRYXELL AWARD COMMITTEE)

Naomi F. Miller is the 2017 recipient of the Fryxell Award for Interdisciplinary Research in archaeology. The Fryxell Award is presented in recognition for interdisciplinary excellence of a scientist who need not be an archaeologist, but whose research has contributed significantly to American archaeology. The award is made possible through the generosity of the family of the late Roald Fryxell, a geologist whose career exemplified the crucial role of multidisciplinary cooperation in archaeology. The 2017 Fryxell Award recognizes the area of plant sciences. Miller specializes in the study of human and landscape relationships through the analysis of macrobotanical remains from archaeological sites. Her career as a preeminent archaeobotanist and prolific researcher has led to over 100 publications and she has continually pushed the boundaries of archaeobotany through interdisciplinary collaborations and innovative work on archaeological site preservation. To reflect the diversity of Miller's contributions to the field, this symposium brings together scholars working with plants, across methods, times, and regions, to present original research addressing the research themes with which Miller has engaged in her career.

[28] Symposium · ROCK ART, EMBODIMENT, AND IDENTITY

We challenge contributors to explore concepts of embodiment and “process” within non-Western ontologies and ethnographies as a lens onto meaning, motivation, and identity. In archaeological contexts, embodiment is usually taken to mean an analysis of the body as lived experience. Turner (1996) for instance suggested that every society is concerned with the “regulation” of populations in time and space, and with the representation or manifestation of the “exterior” body in social space. Researchers can therefore treat images as direct metaphorical comments on social processes, at the same time accepting that artists and viewers experienced the images (in a somatic sense) and did not simply intellectualize them. Process, on the other hand, is akin to the notion of *chaîne opératoire*, and refers to the process of making rock art, from the conception of images through to the “fixing”—and, sometimes, subsequent manipulation, reconfiguration, and “consumption”—of images. By focusing on these broad concepts, and using specific case studies from several countries, this session aims to contribute further insights into how rock art was, and is, viewed and used by the original artists and subsequent viewers to shape, maintain, and challenge ideologies and identities.

[29] Symposium · HIGH-TECH STORYTELLING IN ARCHAEOLOGY*(SPONSORED BY NATIONAL GEOGRAPHIC SOCIETY and ESRI)*

Recent advances in technology have dramatically transformed how archaeologists study and interpret the past. Techniques such as lidar, drone photography, and ground-penetrating radar are readily becoming standard components of an archaeologist's tool kit alongside trowels, brushes, and picks. GIS software has become more powerful and easier to use, allowing archaeologists new ways of collecting, analyzing, managing, and communicating their data. Although these methodologies provide extraordinary potential, they also require a critical examination of their limitations. Furthermore, as archaeologists adopt more high-tech methodologies, they must negotiate challenges with data storage and visualization as well as the attention-grabbing headlines that often accompany the use of cutting-edge tools. This symposium highlights attempts to use twenty-first-century technology to explore ancient societies across the globe. Participants not only will demonstrate how various technologies have advanced our understanding of the past, but also they will reveal how they have (or have not) overcome difficulties using those technologies. In addition, participants will engage in a discussion of how to use high-tech storytelling in order to bring to life the stories of ancient peoples and cultures for a generation bred on tweets and viral videos.

[30] Symposium · BREASTFEEDING AND WEANING PRACTICES IN ANCIENT POPULATIONS: A CROSS-CULTURAL VIEW

Breastfeeding in humans is both a biological process and a culturally determined activity that is shaped by complex interactions of beliefs about health and nutrition, construction of childhood and parental identities, religious values, and lifestyles. Infant feeding practices have important implications for population dynamics, as they affect fertility, morbidity, and mortality patterns. Shortening the duration of breastfeeding has a significant effect on the cognitive and emotional development of children; however, it has potential benefits for the survival of the group by shortening inter-birth intervals. Since the discovery that the nitrogen stable isotope ratio ($^{15}\text{N}/^{14}\text{N}$) in body tissues can be used to reconstruct breastfeeding and weaning practices (BWPs), there have been numerous studies aimed at developing more precise models to reconstruct BWPs in archaeological populations. These studies have improved our understanding of the social and biological determinants of ancient populations, such as health status, child development, social systems, and reproductive strategies. During this symposium, discussions will explore the new methodologies, models, and sustained uncertainties involved with BWPs reconstruction in archaeology. The exchange of results regarding the BWPs of ancient populations in different world regions will further enrich our knowledge of the temporal and cross-cultural variations of BWPs in ancient human groups.

[31] Symposium · BODIES AS NARRATIVES: REVISITING OSTEOBIOGRAPHY AS A CONCEPTUAL TOOL

Bodies are stories. They combine a lifetime of biological change and culturally negotiated activities with corresponding bodily responses. The traces of the life course are embodied in the skeleton itself. The term "osteobiography," introduced by Saul and Saul (1989), refers to the life history recorded in the human skeleton. Reading skeletal data interpretively within cultural and behavioral contexts to trace unique life paths can help to bring human remains out of the ghetto of specialist appendices and into humanistic and multidisciplinary analysis. However, the concept of osteobiography has rarely been systematically explored, remaining simply the detailed description of the skeletal remains of a single individual. This session provides a focused discussion of the concept.

Among the topics to explore are

- The normative biography as a cultural narrative weaving together time, history, and individual experience
- The experience of activity, health, and illness
- How bodies become gendered, aged, and individuated
- Habitual activity molding the body and its identity
- The role of narrative, contingency, and risk in human lives
- Methodologies for constructing osteobiographies, tacking between individual and social scales of analysis and combining archaeological, textual, and/or iconographic evidence
- Biographical narratives as bridges for outreach, education, and communication

[32] Symposium · THE ISLAND ANTHROPOCENE

The colonization of islands has generated significant research interest in archaeology. Islands have long been thought of as laboratories for biological evolution and as important case studies for the development of social and political processes. Though the colonization of islands is often viewed in regional and even macro-regional frameworks, this session takes stock of the state of archaeological knowledge on the impetus, timing and nature of island colonizations at the global scale. This session explores whether island colonization is inherently different from the colonization of mainlands due to the fact that islands are circumscribed, often small and have vulnerable environments. This session further considers variations in colonization processes occurring on a diverse array of islands, including large and small islands, oceanic and continental islands, and islands that experienced multiple waves of colonization. Papers that explore the unique nature of the colonization of islands in a biogeographic, spatiotemporal, or social sense are welcome. Important themes for discussion are anthropogenic changes in the landscapes and biotic communities of islands, islands as nodes within networks of trade and interaction, and the impact of climate on ancient island communities and archaeological sites.

[33] General Session · ARCHAEOLOGY IN CHINA**[34] Symposium · PUEBLO MOVEMENT AND THE ARCHAEOLOGY OF BECOMING**

The concept of movement—pertaining to people but also including weather, moisture, spirits, blessing, and animals—is an essential part of Pueblo identity and history. Movement is also the driving force of every Pueblo's cosmogony from emergence into this world to finding the "middle place." The process of becoming Pueblo is not only shaped by histories of people coming together and moving apart, but also by creating unique philosophies tied to social and natural landscapes. Conversely, these philosophies mold the actions of Pueblo people throughout their dynamic histories. This session explores how diverse modern Pueblo identities, cosmologies, and societies are inherently connected to histories of movement and draws deeply from archaeological, ethnographic, and historic sources. While Southwestern archaeologists have embraced population movement, and in particular migration, in

recent years, we seek to also examine how additional types and scales of movement including coalescence, fissioning, feasting, short-term mobility, exchange of goods and ideas, and the effects of Spanish colonization shaped, and were shaped by, Pueblo identities and societies. Case studies are presented from across the American Southwest with an explicit de-emphasis of the distinction between the prehistoric and the historic to facilitate a holistic discussion of Pueblo history.

[35] Symposium · REIMAGINING HUMAN-ANIMAL RELATIONS IN THE CIRCUMPOLAR NORTH

Although relations among northern peoples and animals have conventionally been approached ecologically and economically, the emergence of human-animal studies suggests a reframing of these relations as equally social, experiential and meaningful. Nonhuman animals, in turn, are recognized as having complex social and cognitive lives and interspecies interactions of their own. An extraordinary northern zooarchaeological record speaks not only to the processing and consumption of animals but to the labor and violence to which domesticates were subjected, and to the biological unfolding of all animals' lives as registered in their tissues. There is also a thick record of technologies related to the harvesting, harnessing and utilization of animals, and depictions of animals and human-animal relations in figurative art. The ethnographic, ethnohistoric, oral historic and ethnoarchaeological records further provide access to ethnozoological discourses and practices related to animal use and animality. This session draws together archaeologists working in various parts of the circumpolar north to think through the record of human-animal relations in novel ways. How did variously positioned actors in different times and places conceptualize and relate socially to nonhuman animals, and how did nonhuman animals relate to their world, including humans and other animals, in an archaeologically visible manner?

[36] Symposium · THE ARCHAEOLOGY OF GLOBAL HISTORY

Archaeological research is local almost by definition. But facing topics such as the emergent processes linked to global history we need to relate to a wider picture since material culture may stem from any part of the world. This session aims to bring together papers that explore the linkage between the local and the global, highlighting methodological issues that challenge our work and showing how the articulation of global trends with local dynamics took place. Thus, we introduce papers dealing with the circulation, distribution and introduction of people, artifacts, technologies, and plants and animals as well as those showing how a global framework helps us understand a single site.

[37] Symposium · ARCHAEOLOGICAL EPISTEMOLOGY IN THE DIGITAL AGE

Digital technologies are becoming integral to archaeological practice, from research to pedagogy and public outreach. In the past decade, many archaeologists have reflected on how these technologies impact their work in the field and in the classroom, but they largely focus on how they developed, implemented, or improved digital tools or techniques designed to organize, analyze, and disseminate data. Yet as digital technologies become increasingly essential to how archaeologists investigate the past, we must also consider how they create new ways of engaging with, interpreting, and classifying materials, things, sites, and regions. For example, how do—or could—digital databases alter our understanding of relationships between and inextricable assemblages of humans, organisms, things, soils, and environments? Must the digital data we create themselves become artifacts of an archaeological record imagined as a collection of static entities? Or can the digital data add a new dimension to our understanding of the archaeological record as a dynamic process made up of sequences of entrained elements? How do digital tools change the way we “assemble” constellations of artifacts and practices, and consequently, reconstruct the past? This session addresses these questions of archaeological epistemology in the digital age.

[38] Symposium · MODELING PEOPLE, PLACES, AND THINGS: REVISITING ARCHAEOLOGY AS MODEL-BASED SCIENCE

Ten years ago, Kohler and van der Leeuw proposed “rethinking archaeology as a model-based science,” which makes conscientious use of simplified representations of socio-natural systems in order to both build and apply archaeological theory. Since that time, use of computational modeling in archaeology has grown, topics being modeled have diversified, and methods for model-building have become more flexible and accessible. There has also been increasing interest in applying archaeological models to contemporary social and environmental issues, incentivizing integration with real-world datasets from within and outside archaeology. This emphasis on application brings new opportunities and challenges, and invites revisitation of questions concerning model generality and equifinality. In this symposium, we focus on the topic of application in model-based archaeology, looking at how archaeologists have applied models, as well as how they would like them applied. The symposium is guided by three broad questions: First, how do we model people in the past, as individuals or aggregates, and who gets modeled? Second, what are the roles of space and place in a model, and when/how do they matter? And finally, how do we connect computational models to the things that compose the archaeological record and to other “real world” phenomena?

[39] Symposium · COPAN I: THE LATE CLASSIC PERIOD

This session explores data pertaining to the first half of the Late Classic period at Copan in Honduras. This period is marked by the reign of three long-lived rulers: Ruler 11, K'ahk' Uti' Chan; Ruler 12, K'ahk' Uti' Witz' K'awiil; and Ruler 13, Waxaklajuun Ubaah K'awiil. Under K'ahk' Uti' Chan the population of the valley rose significantly. Under K'ahk' Uti' Witz' K'awiil the Copan polity is believed to have first expanded into a state. Ruler 12's reign saw the dedication of stelae both in the center of the city, as well as in areas outside of the Copan Pocket, including in Santa Rita. He erected at least one altar at Rio Amarillo, gifted ceremonial ceramic vessels as far away as Tazumal, El Salvador, and performed a scattering ritual at the site of Quirigua, Guatemala. Waxaklajuun Ubaah K'awiil stepped into the shoes of his illustrious predecessor and for 42 years ruled over a community whose art style burgeoned. He proclaimed Copan one of the corners of the Maya world along with Calakmul, Tikal, and Palenque, and presented himself in the guise of various gods on stelae in the Great Plaza, and yet ended his reign beheaded by the ruler of Quirigua.

[40] Symposium · CONTROLLED EXPERIMENTS IN LITHIC TECHNOLOGY AND FUNCTION

Investigating how stone tools were produced and used by hominins is one of the key research areas in the study of the evolution of human behavior. Over the last decades, paleoanthropological research has focused on diverse aspects of stone tool-related behaviors of past humans, such as the procuring of raw materials, manufacturing techniques, the manipulation of physical

properties (e.g., heat treatment), and actual tool use. Experiments have long been used to address these different aspects, aiming to replicate the manipulation of different types of rocks in laboratory-like, forensic settings. Controlled experiments try to improve archaeological interpretations by isolating different physical or chemical factors for a better understanding of which and how different variables affect final results. Further, controlled experiments are designed to improve the identification, measurement, and analysis of all the involved variables and. This session focuses on state-of-the-art research using controlled experiments in both lithic technological (production-related) and functional (use-related) studies. The session's primary aim is to explore different methodological protocols and standards as well as to address research questions aimed at interpreting the archaeological record. A secondary aim is to create awareness of controlled experiments as a valid and important tool in archaeological methodology.

[41] Symposium · BATTLEFIELD ARCHAEOLOGY: PAST, PRESENT, AND FUTURE

Battle represents the climax of political conflict culminating in a loss of life, often on a large scale. Archaeologically, battle is manifest in the rapid deposition of an assemblage of materials and features as well as buried and unburied remains of victims. The social and political consequences of battle often extend far beyond the episode of fighting. Battle can dramatically reshape political boundaries as well political, social, demographic, and economic organization. This symposium focuses on the changing methods, practices, and motivations for the study of battlefields. New technologies, political agendas, historical repercussions, and moral responsibilities to those who died and their surviving families all shape the nature of battlefield studies. Our goal here is to present the latest work within the framing archaeological theory of how we study battlefields, why we do it, and the ramifications of what is learned from battlefield sites. This symposium is limited neither by spatial or temporal parameters. The papers, however, do more than present archaeological contexts; they contextualize the study of battlefields within the science of archaeology and the changing mores of humanity.

[42] General Session · GLOBAL DEVELOPMENTS IN LITHIC ANALYSIS I

[43] General Session · PUBLIC ARCHAEOLOGY I

[44] General Session · HUMAN-ENVIRONMENT INTERACTIONS IN THE MAYA WORLD

[45] General Session · ARCHAEOLOGY IN SOUTH AMERICA I

[46] Poster Session · NORTH AMERICA: PACIFIC NORTHWEST II

[47] Poster Session · TECHNOLOGY, SUBSISTENCE, AND SETTLEMENT ON THE PACIFIC NORTHWEST COAST

[48] Poster Session · ARCHAEOLOGY OF STRANDED, INTERTIDAL, AND SUBMERGED SHORELINES ON THE NORTHWEST COAST OF NORTH AMERICA II

[49] Poster Session · ARCHAEOLOGY OF STRANDED, INTERTIDAL, AND SUBMERGED SHORELINES ON THE NORTHWEST COAST OF NORTH AMERICA

(SPONSORED BY HAKAI INSTITUTE)

Coastal Archaeology in Northwestern North America is offering an expanding range of insights into the late Pleistocene peopling of postglacial environments and the purposeful transformation of the intertidal zone during the late Holocene to enhance and manage shellfish and fish populations. Attentiveness to relative sea level change and employing interdisciplinary tools and methods is a key driver enabling both of these research trajectories. This poster session invites emerging research contributions on this theme from along the Northwest Coast, including the Central Coast and the Discovery Islands in British Columbia where the Hakai Institute has launched a long-term archaeological research program. This poster session aims to provide an enjoyable forum for this convergent research on the coastal margin.

[50] Poster Session · COMPLEX FISHER-FORAGERS OF THE INTERIOR PACIFIC NORTHWEST: THE HOUSEPIT 54 PROJECT AT BRIDGE RIVER, BRITISH COLUMBIA

The Bridge River site is a complex fisher-forager village most intensively occupied between 1,000 and 2,000 years ago. Previous research suggests that it grew to maximum size of at least 30 co-occupied housepits with a population estimated to be 800–1,000 persons by ca. 1250–1300 cal. BP. After this time the village declined in size and was eventually abandoned for several hundred years. During the centuries immediately prior to abandonment, the village was reorganized spatially and developed evidence for inter-household inequality. The Housepit 54 project at Bridge River was developed to gain an understanding of household history during the period of rapid village growth and decline. The final season of excavations in 2016 confirmed a stratigraphic sequence of 17 anthropogenic floors and approximately six periods of house expansion. Interdisciplinary research is focused on examining social and economic factors associated with household history along with a host of tangential interests including breeding and consumption of domesticated dogs. Posters in this symposium explore housepit stratigraphy, dating, cultural inheritance, lithic technological organization, subsistence (zooarchaeology, paleoethnobotany, and isotope studies), canid phylogeny using ancient DNA, geochemical signals in floors and lithic raw materials, spatial distributions, and public interpretation of indigenous cultural heritage.

[51] Poster Session · PALEOARCHAIC SETTLEMENT OF THE SOUTH SALISH SEA DURING THE LATE PLEISTOCENE-HOLOCENE TRANSITION: A VIEW FROM BEAR CREEK (45KI839)

The Bear Creek site (45KI839) in Washington State's central Puget lowland is among the earliest lithic artifact-bearing, professionally excavated archaeological sites on the Pacific coast between Haida Gwaii and the Santa Barbara Channel. Data recovery excavation in 2013 provided an unprecedented view of Native American settlement in a rapidly changing coastal lowland setting during the Late Pleistocene-Holocene (LPH) transition. The site is an epitome of difficulties inherent in finding deeply buried, intact early components in dynamic depositional environments. Our site formation model is therefore foundational, drawing on geoarchaeological data at the basin- and micro-scales, on paleoenvironmental evidence, and on a comprehensive dating regime. The lithic assemblage includes stemmed and unfluted concave-base projectile points and a variety of bifacial and expedient flake tools sharing affinities most closely with Western Stemmed Tradition assemblages throughout the greater interior Pacific Northwest and Great Basin, and is similar to a string of LPH sites along the coast from Haida Gwaii to South America. The contributions to this session explore individual analytic facets of the investigations at the Bear Creek site, while drawing broader conclusions about this site as a coastal variant of the Western Stemmed Tradition.

[52] General Session · THE ARCHAEOLOGICAL NORTHEAST

[53] General Session · RECENT DEVELOPMENTS IN ARCHAEOBOTANY AND PALEOETHNOBOTANY

[54] General Session · AFRICAN LITHIC STUDIES I

[55] General Session · AFRICAN LITHIC STUDIES II

[56] General Session · INCAN ARCHAEOLOGY I

[57] Symposium · EARTH OBSERVATION FOR ARCHAEOLOGY IN ARID LANDS

Nowadays, the use of geospatial technologies in archaeology is widespread among archaeologists. Arid lands, characterized by patchy and scarce vegetation, low urbanization, and excellent visibility of archaeological remains, are an ideal scenario for the application of nondestructive, noninvasive, and cost-effective investigations based on remotely sensed data. In this session, we wish to bring together researchers working on world's arid lands, to share results, issues, and perspectives on Earth Observation for archaeology in hot and cold deserts and semi-deserts. We aim at fostering the debate around remote techniques to the archaeology of arid landscapes, gathering papers addressing multi-proxy approaches for the reconstruction of past human-environment interactions by means of geospatial technologies. No limit is set on the geographic or chronological contexts.

[58] Symposium · CASTING EMPIRE: METAL PRODUCTION IN THE EARLY IMPERIAL CHINA

It is widely recognized in the literature that the production of metal objects, including ritual vessels, weapons, coins, and a wide range of daily use tools, played an essential role in the state financial system of ancient China. Nonetheless, many underlying but essential questions related to metal production still have not been fully explored, such as the management of techniques and labor, forms and organization of workers, ways to control the procurement and movement of raw materials, and transportation of final products or resources. This symposium provides a platform for scholars to introduce their latest research addressing issues mentioned above. We expect the communication fostered by the symposium can not only enhance the understanding about the contribution of metal production to the historical formation of Early Chinese Empires but also facilitate the identification of new methodology and theoretical frameworks for studying debitage or remains in archaeological contexts.

[59] General Session · ARCHAEOLOGY IN THE AMERICAN SOUTHWEST II

[60] Symposium · PRECOLUMBIAN TEXTILE TOOLS AND TECHNOLOGIES: CASE STUDIES FROM NORTH AMERICA AND MESOAMERICA

While the importance of textiles and the techniques of precolumbian textile production have been well documented in the Andes, far less research has been conducted on textile tools and technologies in North America and Mesoamerica. With only a few specific exceptions, the climates of these regions are not conducive to preservation, and textiles themselves are therefore only rarely preserved. Several other sources of relatively untapped evidence on textile production exist, however, in other archaeologically recovered material culture such as implements used for creating textiles, including spindle whorls, net gauges, needles, and weaving awls; objects used with or associated with textiles, such as fishing net weights and floats; and even raw materials such as cultivated or collected fibers and pigments. This session explores how analysis of these artifacts carries great potential for insights into textile techniques and technologies, as well as into the practical and symbolic use of textiles in these societies.

[61] Symposium · MAKING FAUNA MATTER IN ARCHAIC PERIOD RESEARCH: EXPLORING ADAPTATION, POPULATION GROWTH, AND CULTURAL PRACTICE THROUGH THE DIGITAL INTEGRATION OF EASTERN ARCHAIC FAUNAL DATASETS

Although recovery and identification of animal remains from Eastern Archaic sites has been standard procedure for decades, zooarchaeologists usually have not been at the forefront of archaeological debate about Archaic period variability and change. Even though they are commonly examined at the site and local level, faunal data have been critically evaluated in macro-assessments of what happened during the Archaic in only a few instances. Fortunately the development of digital repositories such as the Digital

Archaeological Record (tDAR) means that it is now possible to incorporate faunal evidence into archaeological research more directly. Preservation and integration of more than 50 significant faunal databases in tDAR by the Eastern Archaic Faunal Working Group (EAFWG) has facilitated the exploration of possible causes for variability and change in the use of aquatic resources by Archaic peoples within and across the subregions of the interior North American Eastern Woodlands. The methodological approaches of the EAFWG and the integrative tools available in tDAR have made it possible to closely examine faunal data at multiple scales. Ultimately the work of the EAFWG is leading to new perspectives on the roles of ecological, demographic, and cultural factors in the choices of Archaic period populations.

[62] General Session · ARCHAEOLOGY IN SOUTH AMERICA II

[63] Forum · REPATRIATION 101

The 2016 SAA Survey on Repatriation revealed that the level of experience that someone has with repatriation affects their opinion of its impact on archaeology. Many respondents who have actively worked in repatriation view the process as successful, or as having benefits for the profession. This forum will share examples of repatriation work and allow SAA members to hear firsthand accounts of repatriations and learn about the process and procedures. It is hoped that this will clarify the issues involved for those archaeologists who have previously only viewed this work from afar. The participants have conducted repatriations and work in museums, universities, and for tribes. Topics to be discussed will include the documentation of human remains, the challenges of multiple tribe repatriations, the involvement of non-federally recognized tribes, and processes that are distinct to universities and to museums. Audience questions about the details of repatriation will be greatly welcomed.

[64] Forum · AFRO-LATIN AMERICAN ARCHAEOLOGY

This forum will present and debate a rapidly growing focus of study in archaeology: the roles, material lives, and lived experiences of peoples of African descent in Latin America and the Caribbean. During the long history of the African slave trade, over 90 percent of the Africans forcibly imported into the Americas went to Latin America and the Caribbean. Archaeology of African and African American contexts in the United States is now a well-established realm of inquiry that has given us an unparalleled view into the unwritten history of enslaved and free daily lives; the impacts of African presence in Latin America were just as profound and started even earlier. In fact, the events and processes related to and produced by Afro-Latin Americans—cultural forms, community practices, and pivotal agents—were crucial to the making of Latin America and continue to be a vital element informing Latin American life today. A focus on Afro-Latin American archaeology opens up dialogues about colonialism, gender, race, labor, and systems of power and inequality and offers the possibility to transcend boundaries in archaeological practice and knowledge inhibited by colonial jurisdictions and contemporary nation-states.

[65] Forum · PERTURBING THE PEACE: A TRIBUTE TO JOAN GERO

Joan Gero (1944–2016) was an independent thinker, a purveyor of creative ideas, and a pioneer in engendering archaeology. Over the course of several decades, her thoughtful and provocative contributions opened new vistas onto the way archaeological knowledge is constructed, the workings of gender within the field, and the Andean Formative period. In her final work, entitled *Yutopian: Archaeology, Ambiguity, and the Production of Knowledge in Northwest Argentina*, she argued strongly for the importance of situating knowledge production, honoring the ambiguity of the archaeological record, and resisting the tendency to erase “disobedient data.” This symposium brings together friends, colleagues, and intellectual heirs to celebrate her contributions to the discipline as well as her legacy in terms of moving beyond binary thinking and “unflattening” the past.

[66] Forum · METADATA AND DIGITAL MANAGEMENT IN ARCHAEOLOGY TODAY

The increased availability of digital technologies has revolutionized the way we record archaeological information. We can take thousands of photos of a site or artifact, have each photo linked to a specific location, and record a multitude of other variables quickly and easily. However, this exponential increase in the creation of digital information about archaeological sites, from new data collection and the digitization of legacy materials, has not resulted in a corresponding increase in the discussion of data preservation and management. Digital asset management and metadata have yet to be priorities for many archaeological projects. This often causes archaeologists to spend hours outside of the field dealing with information management issues because adequate planning and guidelines have yet to be employed consistently. While these issues are not new, the increasing call for open science and accessibility pushes archaeologists to organize their digital information into accessible formats with appropriate metadata to describe that information. These needs point to the importance of integrating digital information management and metadata into archaeological project planning as early as possible. This forum is interested in discussing metadata and digital management in archaeology today by exploring current practices and encouraging standards across the different sectors of archaeology.

[67] Lightning Rounds · THE QUESTION OF C-SHAPED STRUCTURES ACROSS THE MAYA LOWLANDS

This session will focus on the topic of “C-shaped structures” and related architectural forms across the Maya lowlands, including “open-fronted structures” and “bench-type buildings.” Many more C-shaped structures have been identified since their establishment as important horizon markers for the Terminal Classic period more than twenty years ago. C-shaped structures and related architectural forms from northern Maya lowland sites will be considered alongside those from the southern Petén and Petén Lakes regions, as well as western and northern Belize. By bringing together scholars who have investigated these structures over the last few decades, we will more thoroughly compare and contrast these architectural forms that appear at the end of the Classic period and their associated archaeological contexts. Through these discussions we hope to achieve a clearer understanding of formal variation, potential functions, and what these types of structures represent within the larger setting of the Classic to Postclassic transition.

[68] Symposium · CONTESTED CAVES: THE POLITICS OF UNDERGROUND PLACES

Moving beyond established archaeological narratives of the human uses of caves, we will explore some of the diverse political tensions surrounding social engagements with these spaces, particularly from an historical perspective, drawing on case studies from around the world and from a variety of disciplines. Examples of issues we seek to discuss include: power relations inherent in religious rituals/secular activities performed in and around caves; cave deities/forces sometimes regarded as threatening the order of the outside world, and therefore often actively appeased, controlled, destroyed or evicted; different religious/political groups fighting over control of sacred caves; tensions over the maintenance of secrecy about the locations of special caves; conflicts between local people and outsiders over the occupation and use of important natural and cultural heritage caves; competition between cave owners or environmental groups over their commercial exploitation; tensions between the development of tourist show caves and the protection of caves and karst areas from environmental pollution and other damage; tensions between looters and archaeologists over archaeological deposits in caves; tensions over legislation enacted to protect caves; tensions over whether or not certain caves should be designated as national monuments; and tensions between different artistic and scientific conventions in representing caves.

[69] General Session · ARCHAEOLOGY OF THE CARIBBEAN I**[70] Symposium · THE FUTURE OF FUNDING FOR ARCHAEOLOGY**

Funding for archaeological research from governmental and philanthropic sources is becoming scarcer. Philanthropy is becoming results driven, moving away from basic research and increasingly into short-term projects. At the same time, costs for archaeological research are increasing, reflecting upward shifts in living costs at emerging economies and costs of analytical research. This session will address three questions through papers from established funders and innovators pursuing alternative funding models. First, what are the drivers of this new environment and how will impact-oriented philanthropy affect funding for archaeology? Second, how are established funders responding to these trends and how do they see the future of funding for research? Finally, does the experience so far with alternative funding approaches suggest that they are able to replace sources in decline?

[71] Symposium · COPAN II: THE LATE CLASSIC, TERMINAL CLASSIC, AND POSTCLASSIC PERIODS

In this session, scholars present new data on the Copan Valley, and other closely-linked sites, in the latter half of the Late Classic period, and during the Postclassic period. The most important ruler of this era was Ruler 16, Yax Pasaj Chan Yopaat, who governed for 47 years. Following his death, only one unfinished monument was dedicated, Altar L, which features Ukit Took', the 17th Ruler. Debates exist as to the potential causes of the cessation of the construction of monumental architecture at Copan and the large demographic drop that occurs in the ninth century CE. Scholars have questioned whether Copan was completely abandoned and if so, when, as well as investigated to what degree the hinterlands were or weren't abandoned. New work on ceramics, lithics, the environment, and recent excavations will add to the ongoing conversation concerning Copan's ancient and more recent past. Rather than review previous hypotheses, researchers will present new data concerning Copan. The Postclassic history of the valley, in particular, has benefited in the last decade from the excavation of post-collapse occupations such as at the site of Rastrojon and around the center of Rio Amarillo.

[72] Symposium · LIFEWAYS IN BRONZE AGE CHINA

Academic interest in the Chinese Bronze Age has tended to focus on larger scale social processes, such as state formation, urbanization, and technological change. This symposium seeks to broaden the understanding of the period by exploring the smaller scale processes that people engaged in the daily lives. By covering Bronze Age lifeways, we hope to highlight the significance of bottom-up processes and their recursive relationship with the larger social transformations occurring at this time. This symposium will introduce recent archaeological discoveries relating to daily lived experience in Bronze Age China, covering topics such as houses and household activity, craft production, daily ritual practice, cooking, and other aspects of quotidian life.

[73] Symposium · CONTINUITY AND CHANGE, TWO DECADES OF EXCAVATION AND RESEARCH AT ÇATALHÖYÜK

Excavations at the Neolithic Anatolian tell of Çatalhöyük have spanned more than two decades and comprised multinational teams of researchers, students, staff, and volunteers. The overarching aims of the project include a commitment to reflexive archaeological practice and to situate the site within its environmental, economic, and social context. These aims have remained largely unchanged, though many research questions, interpretations, practices, and technologies have transformed. This third and final phase of the Çatalhöyük Research Project (ÇRP) has focused on the multi-scalar synthesis of data collected from various specialist labs, as well as the archiving of the vast corpus of collected data. With the long-standing excavations coming to a close, we consider the current state of research and methodologies conducted at the site within the context of the changes and continuities that have occurred throughout the project's life span. In particular, we highlight the unique set of challenges and opportunities that arise from working with large amounts of legacy data. Topics that may be explored include: challenges and opportunities inherent in working with large datasets, legacy data, and the nature of and potential for collaborative work.

[74] Symposium · GENDER, RACE, AND OTHER CONSEQUENTIAL CATEGORIES: EXPERIMENTS IN INTERSECTIONAL ARCHAEOLOGY

The notion of intersectionality—conceiving identity categories such as race, age, class, and gender as covalent and entangled—is neither new nor new to archaeology. Archaeologists have long been paying simultaneous attention to multiple vectors of identity. Yet intersectionality's agenda seems radical, even as it becomes mainstreamed within scholarly and popular contemplations of power. Within archaeology, intersectionality joins a host of postmodern approaches to categorical plurality that treat structural identity categories as fluid and multivalent. More established approaches, such as hybridity, postcoloniality, feminism, and critical theory, are compelling but have their own limitations. Does intersectionality offer something different? Can archaeology offer anything to the study of intersectionality? Is any archaeology of violence, privilege, and embodied identity intersectional, regardless

of context or intent? Or does intersectionality demand a politically disruptive agenda? Is it even appropriate to apply this framework outside of the black/feminist/capitalist contexts in which it originated? With these questions in mind, session papers will take a critical, experimental approach to intersectionality within a variety of archaeological contexts.

[75] Symposium · ARCHAEOLOGICAL MICROHISTORY AT A PLANNED COLONIAL TOWN IN HIGHLAND PERU

A generation after the Spanish invasion of the Inka Empire, the indigenous communities of the Viceroyalty of Peru were subjected to one of the largest mass resettlement programs by a colonial power: the Reducción General de Indios (General Resettlement of Indians). Over a million native people were resettled to reducción towns to facilitate religious indoctrination and tribute collection, and more broadly, to colonize the deepest recesses of everyday practice to produce newly “civilized” communities. How such colonialist global schemes actually manifested in disparate contexts in the Andean landscape, however, is only beginning to be explored archaeologically. This session presents the largest scale excavations in a highland reducción to date. Situated in the exceptionally well-preserved reducción of Santa Cruz de Tuti (a.k.a. Espinar de Tuti) in the Colca Valley, the Proyecto Arqueológico Tuti Antiguo (PATA) excavated in varied domestic and ritual spaces in 2016, including elite indigenous domestic compounds, the sacristy and rectory of the main parish, and a chapel. Our results compare the contexts of domestic and liturgical practices of indigenous households and the clergy, and trace out threads of continuity and change through the colonial and early republican eras.

[76] Symposium · WHAT TO DO WITH “MEGASITES” IN PREHISTORY? FURTHER EXPLORING THE “MEGASITE” CONUNDRUM

Periodically in the prehistory of human settlement, very large sites have appeared that challenge our assumptions about settlement categories. Such sites, including Chaco Canyon, the Trypillia megasites, Bigo, Taosi, and Co Loa, are often characterized as urban, proto-urban, pre-urban, or not urban. However, even when making allowances for regional variation in urban form, these sites are anomalous. Roland Fletcher has argued that they might usefully be considered as examples of a unique trajectory of growth toward extensive dispersed settlement forms, complementary to but different from the trajectory of low-density agrarian urbanism and the recent trajectory toward dispersed industrial urbanism. A session at the SAA conference in 2013 explored the characteristics of some salient examples of these settlements, including the European Iron Age Oppida, Cahokia, and Great Zimbabwe. This session will include additional regions and time periods, particularly in Africa, South America, the southwest USA, and Asia and extend the discussion of how to theorize them. A consideration of these sites as comparable phenomena has the potential to transform our models of settlement growth, give new significance to regional culture histories, and perhaps have implications for our urban future.

[77] Symposium · HISTORICAL ECOLOGY FOR APPLIED ARCHAEOLOGY: CLIMATE CHANGE, RESOURCE MANAGEMENT, AND GOVERNANCE

Historical ecology is a research program concerned with the interactions of people and environment through time and the consequences of those relationships on the formation of contemporary and ancient landscapes, habitats, and culture. Archaeology has developed theoretical and methodological tools for contributing to historical ecological research and constitutes a major part of this multidisciplinary effort. Through its applied lens, historical ecology continues to grow as a major field of inquiry dealing with questions around climate change, environmental conservation, Indigenous governance and autonomy, and resource management systems. This session explores how archaeologists are using the historical ecology research program to guide their research design, praxis, and even ontologies. Such research will highlight current and on-going archaeological contributions to climate change research, and ecological/heritage management and conservation that is socially just.

[78] Symposium · ADVANCES IN ARCHAEOLOGY OF PREHISTORIC AND EARLY CHINA

The last decade has witnessed a dramatic progress in development of research on archaeological sciences in China. Recent achievement in this area has resulted in some interpretations on new materials of prehistoric and early historic China that would be of interest to international communities. Papers in this symposium will present ongoing projects that address new methods, results, and perspectives. Papers have striven to integrate analyses into broader interpretations of meaning of the origin and evolution of human and technology, transition of culture, origins of agriculture, rise of early state, and paleo-environmental reconstruction and so forth from approaches of archaeological sciences (e.g., archaeobotany, zooarchaeology, stable isotope analysis, use-wear and residue analysis, material analysis), ethnoarchaeology, and anthropology.

[79] Symposium · TOOLSTONE PAPERS IN HONOR OF THE CAREERS OF CHARLOTTE BECK AND GEORGE T. JONES

This session honors the careers of Charlotte Beck and George T. Jones and the important contributions they have made to lithic studies. The session combines papers by former students and colleagues and a discussion of their careers to address Beck and Jones's impact on lithic analysis, particularly the study of lithic procurement, mobility patterns, geochemistry, reduction sequences, and technological organizational and evolutionary approaches to archaeology. While Beck and Jones's work predominately focused on the Great Basin, their influence has reached beyond this geographic area, due to the transferable nature and broad applicability of their approaches to archaeology. They have had broad methodological and theoretical impacts on the field of archaeology, which session participants will address through discussions of research in a variety of geographic regions, temporal contexts, and to address a wide variety of thematic issues. These papers highlight the important contributions Beck and Jones have made to archaeology throughout their careers.

[80] Symposium · NIGHT AND DARKNESS IN PRECOLUMBIAN MEXICO AND CENTRAL AMERICA

As night rose in Mexico and Central America, another realm emerged to replace the world of daylight and warmth. Temperatures dropped as the sun set, crepuscular animals appeared, selenotropic plants delighted in the moonlight, and humans engaged in a variety of nocturnal activities that differed significantly from those conducted during daylight hours. Darkness is one aspect of the night that is not exclusive to it and lends itself to analysis as well. Using similar theories for studying the day, practice theory, nighttime household archaeology, phenomenology, and adaptationist approaches all set the stage for enlivening the nightscape and

darkness. Variables such as age, gender, class, ethnicity, and occupation, among others, are interwoven and constitute integral aspects of reconstructing the night and illuminating darkness since individuals within society experience culture from their own unique viewpoints. The four-field approach presents an advantage for exploring the depths of darkness, whether at night or otherwise, as ethnography, linguistics, and biological anthropology contribute to a well-rounded archaeology of the night. By approaching the study of ancient cultures from a dark perspective, we can learn a great deal more about how ancient humans flourished and coped, for they lived in light as well as darkness.

[81] Symposium · MOMENTS IN TIME: RE-CREATING HISTORY WITH THE BAYESIAN APPROACH

This session brings together papers that discuss how archaeologists can use the Bayesian approach to create histories approximating lived experiences on multiple scales. Over the past five years there have been many studies that used Bayesian modeling to revise aspects of ancient European history. These projects have generally produced chronologies of higher accuracy, transparency, and reproducibility than those created from informal interpretation. This work has been referred to as the third radiocarbon revolution, partially because it has required European archaeologists to completely rethink long-standing culture-historic chronologies and devise new narratives for interpreting the past. A theme of the session is how chronological reexaminations with Bayesian modeling interface with archaeological theory. In many cases the Bayesian approach has involved the quantification of previously unrealized temporal phenomena and this session will address how our theoretical approaches in archaeology might change due to powerful temporal analyses. Papers in this session will: 1) review how Bayesian chronological modeling has begun to challenge understandings of important topics, 2) discuss specifically how Bayesian modeling has revised historical narratives, and/or 3) problematize long-standing chronologies and discuss plans for their revision.

[82] Symposium · IN THE LAND OF THE SKY: RECENT INTERDISCIPLINARY ARCHAEOLOGICAL RESEARCH IN THE LOWER RIO VERDE VALLEY, OAXACA

This session presents results of the last decade of interdisciplinary archaeological research in the lower Rio Verde Valley on the Pacific coast of Oaxaca, Mexico. Archaeological research during this period has focused on the Formative period, although ongoing settlement pattern studies, paleoecological research, and human dietary studies have implications for the entire prehispanic sequence. Major research problems that are discussed include the origins of agriculture and sedentism during the initial Early Formative period; the relationship between religion and politics at the end of the Formative; urbanization and political centralization; the aftermath of political collapse; and the impact of Formative period environmental change on settlement, land use, and diet. Data presented in the session are the result of large-scale excavations at the Early Formative period site of La Consentida, the Terminal Formative urban center of Rio Viejo, the Terminal Formative outlying sites of Cerro de la Virgen and Loma Don Genaro, and the Early Classic period site of Charco Redondo. Papers also present paleoecological research based on sediment cores extracted from ponds and estuaries, isotopic studies of human and animal bone, geoarchaeological research on soil fertility, regional full-coverage survey, archaeozoology, and studies of artifacts from the region.

[83] Symposium · POLITIES, HINTERLAND COMMUNITIES, AND EVERYTHING IN BETWEEN: TWENTY-FIVE YEARS OF ARCHAEOLOGICAL RESEARCH IN NORTHWEST BELIZE

This session synthesizes 25 years of archaeological investigations taking place in the Rio Bravo Conservation and Management Area (RBCMA) of northwest Belize, a region that was deeply transformed by the life practices of the Maya over a period of nearly 2,000 years. From small beginnings in 1992, the Programme for Belize Archaeological Project (PfbAP) has since grown to encompass various research efforts, fostering cooperation among archaeologists, geographers, and environmental scientists. As a result, an extensive body of data concerning the character of many of the region's recorded sites has been produced, shedding light onto the lives of the ancient Maya that inhabited this corner of Mesoamerica from the Preclassic (1000 BCE–250 CE) to the Terminal Classic (850–950 CE) periods. This session builds on the regional focus to explore the interrelationships between the varying communities from various theoretical positions as supported by empirical data. Sites discussed in this session include the large Maya sites of La Milpa, Dos Hombres, and Maax Na. Mid-level sites of Say Ka and Wari Camp are also discussed, forming a bridge to the numerous smaller settlements that extend across the landscape such as Medicinal Trail, Hun Tun, and La Milpa North.

[84] Symposium · REGIONAL TO INTERNATIONAL COLLABORATIONS IN AMERICAN ARCHAEOLOGY: THE LEGACY OF SUZANNE FISH AND PAUL FISH

During the course of five decades, Paul Fish and Suzanne Fish have instigated and nurtured a series of innovative archaeological research and educational partnerships with their numerous colleagues and students in the Americas. These collaborations have established highly productive linkages among groups and individuals from a diverse range of institutions including universities, national and international government agencies, nonprofit research foundations, and other stakeholders. Consistent and crosscutting themes of their research collaborations include (but are not limited to) traditional agriculture and water management, social organization and craft economies, and coastal foraging adaptations. Mentoring students and engaging in community outreach are also central to the initiatives that Suzanne Fish and Paul Fish have developed and supported during their professional careers. These activities include numerous archaeological field schools as well as laboratory training programs at the Arizona State Museum and the School of Anthropology at the University of Arizona. Their former students are now practicing archaeology throughout the Americas and beyond. This session features presentations by a small sample of their many colleagues in the Greater Southwest, Mesoamerica, and South America.

[85] Symposium · RETHINKING METHODS OF FAUNAL ANALYSIS

Much progress has been made in recent years with respect to the analysis of faunal remains. Advances include improved protocols for the study of seasonality, the production of new control data on carnivore feeding behavior, as well as efforts focused on a better understanding of the process of identification and quantification of faunal specimens. However, many questions remain open or require additional research. For instance, how robust are our faunal identifications? Are NISP and MNE replicable and accurate measures of abundance? How can we explain variation in counts of cutmarks or in the identification of taphonomic agents? Do

archaeozoologists produce accurate interpretations of seasonality patterns? This symposium will address these and other methodological problems that are central to the analysis of faunal remains.

[86] Poster Session · ADVANCES IN BIOARCHAEOLOGY AND ARCHAEOLOGICAL SCIENCE

[87] Poster Session · NEW GEOARCHAEOLOGICAL AND GEOPHYSICAL RESEARCH

[88] Poster Session · OBSIDIAN SOURCING, ANALYSIS, AND IMAGING

[89] Poster Session · INTERPRETING LITHIC ASSEMBLAGES

[90] Poster Session · ARCHAEOLOGY IN EUROPE I

[91] Poster Session · ANALYTICAL METHODS FOR LITHIC TECHNOLOGY

[92] General Session · BIOARCHAEOLOGY AND GENETICS

[93] Forum · A HISTORY OF THE CARIBBEAN IN 100 OBJECTS

This forum stars objects from the Caribbean with a story to tell. Fifteen minutes of interview-style discussion between presenters, session moderators, and the audience will focus on a single object from the Caribbean that crosses past and present, its appearance, meaning, production, contexts, overarching historical connections, and relevance for contemporary society. From the humdrum and overlooked, to the extraordinary and exhibited, these objects of conversation are tied to stories about a place, community, practice, or moment that reveal the rich history of the cultures and societies of the Caribbean from particular and personal perspectives. This forum will be recorded and later launched/broadcast as one or more episodes of the podcast series *A History of the Caribbean in 100 Objects* as told through objects from the earliest period to modern times. For more information see <http://www.shoresoftime.com/podcast/>.

[94] Symposium · ORIGIN AND DEVELOPMENT OF THE PRECOLUMBIAN CITY OF TAMTOC, IN THE HUASTECA POTOSINA, MEXICO: RECENT INVESTIGATIONS

Tamtoc is one of the most important settlements in northeastern Mexico, wherefore it is essential to address the phenomenon of the urban society with an interdisciplinary approach. The aim of this symposium is to characterize the constituents proper of the historical and cultural development of this urban society that managed to develop one of the most distinctive settlements in the so-called Huasteca region during prehispanic times. The contributors are going to present the results of a variety of recent investigations intended to promote the dialogue and increase the awareness of the issues discussed here.

[95] Symposium · EXPLORING PREHISTORIC PERCEPTIONS OF “NATURE”: CAN WE GO BEYOND ECONOMIC HUMAN-ENVIRONMENT INTERACTIONS?

Archaeology has witnessed a theoretical florescence of “ecological” approaches (i.e., HBE, Niche Construction, Historical Ecology) resulting in human-environment interactions as a common research theme. Western culture traditionally makes a clear distinction between nature and culture, but this is not typical of worldviews among preindustrial societies. Past perceptions of human relationships with nature are essential for understanding the impact prehistoric societies had on their environments. Here we aim to push theoretical boundaries, to ask how we can understand prehistoric perceptions of “nature.” Using varied regions and datasets, can we move beyond the more common essential economic discussions and probe our evidence to gain meaningful insights regarding how people in the past understood their place in “nature.” While prehistoric art is often employed toward this question, ecological datasets are usually not. But, could the materials which made the dwellings, the resources that formed the basis of foodways, and the ecological “footprint” of past societies also provide similar insights? It is with this perspective in mind that we wish to explore human perceptions of nature through interdisciplinary studies. This collaboration could be key to interpreting our ecological and archaeological datasets toward a greater understanding of human behavior.

[96] Symposium · PROTEINS IN PLAY: THE APPLICATION OF ANCIENT PROTEINS TO THE STUDY OF DIET, DISEASE, CULTURE, AND EVOLUTION

The last few years have seen a growing interest in the application of protein analysis to archaeological materials, analogous to the application of DNA sequencing. This session will highlight the various contributions the study of ancient proteins can make to our understanding of the archaeological past. Despite the relative infancy of the field, we are currently witnessing a diversification in the types of tissues analyzed, time periods sampled, and questions asked. Drawing on this diverse array of possibilities, this session aims to provide a platform to discuss methodological developments and trends, novel applications, and future directions.

[97] Symposium · ASSESSMENT IN ARCHAEOLOGY EDUCATION: PROJECT ARCHAEOLOGY RESEARCH

Project Archaeology is well-known around the country for its inquiry-based archaeology curricula. We reach an estimated 300,000 students annually with our curricular materials. While these numbers are great, it is also important to know if students are understanding the materials and learning the lessons we teach. If students have been taught the curriculum, but do not understand

the importance of stewardship or how to interpret evidence to build content, our materials will be useless; if the materials do not meet the needs of educators, they will soon be outdated. Including descendant communities in curriculum development, assessing the needs of teachers, and monitoring results of consultation to maintain long-term relationships are also important areas of research for archaeology educators. To this end, Project Archaeology national staff, state program coordinators, and master teachers have participated in several research projects to assess student learning and the efficacy of professional development for educators.

[98] Symposium · LOST NARRATIVES: CURRENT HISTORICAL ARCHAEOLOGY IN SOUTHERN CALIFORNIA

One of the most powerful roles of historical archaeology in the modern era is the telling of histories that have been overlooked. These "lost narratives" represent society as a far more complex entity than that encoded in national/regional ideology. This is particularly true in southern California where mainstream perspectives on history are distinctively simplistic. Until relatively recently, historical archaeology in the region was also comparatively traditional, focused on colonial-era missions or narrow slices of historic contexts exposed by modern construction. Recent projects, however, delve more deeply into the complexity of southern California, emphasizing questions of memory, consumption, identity, conflict, political economy, and the sheer intricacy of the communities that have coexisted in the region over time. Papers in this session represent time periods from the late eighteenth century through the 1940s. Documentary analysis combines with diverse archaeological methodology to maximize new interpretive opportunities and creative applications of theory. Engagement with descendant communities and the use of legacy collections enrich these projects and highlight fruitful directions for future scholarship.

[99] Symposium · FROM FORAGERS TO FRONTIERS: RECENT RESEARCH ON THE ARCHAEOLOGY OF THE ORDOS REGION, CHINA

A recent increase in archaeological fieldwork in the Ordos Region, China combined with new methodological and theoretical frameworks has led to new understandings of previous assumptions about the development of life in this understudied region. Occupying a vast territory covering the areas of southwestern Inner Mongolia, Ningxia, and Shaanxi Province, the Ordos Region plays a very important role in forming a better understanding of Chinese prehistory. This session includes papers that span from the Upper Paleolithic period to the Han Dynasty. The goals of the present session are to synthesize and advance research on understanding environmental change and human response, movement of domesticated plants and animals in prehistory, cultural interaction and entanglement with Central Asia, developments in metallurgy and jade, and the position of this region as a frontier in prehistory.

[100] General Session · GLOBAL DEVELOPMENTS IN LITHIC TECHNOLOGY II

[101] General Session · POLITICS AND INTER-POLITY DYNAMICS IN THE MAYA WORLD I

[102] General Session · ARCHAEOLOGY IN THE AMERICAN MIDWEST I

[103] General Session · THE ARCHAEOLOGY OF MINING AND RESOURCE EXTRACTION IN HISTORIC NORTH AMERICA

[104] General Session · ARCHAEOLOGY IN THE AMERICAN SOUTHWEST I

[105] General Session · HOHOKAM ARCHAEOLOGY

[106] General Session · USING ETHNOGRAPHIC AND ETHNOHISTORIC SOURCES IN ARCHAEOLOGY

[107] General Session · THE ARCHAEOLOGY OF CONFLICT IN THE HISTORIC ERA NORTH AMERICA

[108] Forum · CARING FOR HOMELANDS, PART 1: TRIBAL HISTORIC PRESERVATION IN THE UNITED STATES

(SPONSORED BY INDIGENOUS POPULATIONS INTEREST GROUP, COMMITTEE ON NATIVE AMERICAN RELATIONS)

Tribal Historic Preservation Offices are charged with the responsibility of preserving, maintaining, and revitalizing tribal cultural resources for future generations. In addition to these programs, numerous other federal, state, and non-recognized tribal communities operate similarly oriented cultural resources departments. This forum brings together Tribal Historic Preservation and Cultural Resource Managers from across the United States to discuss the current state and future trajectory of tribal resource management. This forum is part of an ongoing attempt to highlight the unique issues that tribal communities encounter when attempting to care for cultural resources that extend well beyond the tangible remains associated with the archaeological record. Panelists will address how their offices and communities define tribal historic preservation; discuss how they developed their plan for managing tribal cultural resources; and share the strategies they use on the ground to implement these plans. Of particular focus is examining how each program balances the requirements of state and federal heritage preservation regulations with the specific needs and cultural values of the communities whose interests they protect.

[109] Forum · CREATING SAFETY: ADDRESSING SEXUAL HARASSMENT AND ASSAULT IN ARCHAEOLOGY*(SPONSORED BY WOMEN IN ARCHAEOLOGY INTEREST GROUP)*

In response to recent studies showing a sexual harassment and assault problem in the field sciences, the Women in Archaeology Interest Group sponsored the Forum Addressing Sexual Harassment and Assault in Archaeology at last year's meeting in Orlando. This provided space for archaeologists from across the discipline to come together and brainstorm ways to create safety in our field. This year's forum will focus on efforts of the SAA and the SAA community at large to implement action proposed at the forum. Work-in-progress includes a clear statement on sexual harassment and assault from the SAA, as well as the development of education and support programs at all levels of the discipline.

[110] Forum · ADVANCEMENTS AND PROSPECTS IN GEOARCHAEOLOGY TODAY: THE SAA GIG AT 20, PART 2*(SPONSORED BY GEOARCHAEOLOGY INTEREST GROUP)*

In celebration of 20 years of the Geoarchaeology Interest Group (GIG) in the Society for American Archaeology, we seek to clarify the present and future contributions of geoarchaeology, in terms of practical techniques, analytic and interpretive methods, and theoretical approaches. Whether as its own field or hybridized multidisciplinary endeavor, geoarchaeology has grown over the last decades to encompass a multitude of research themes and operational procedures, but what unifies this diversity under the name of geoarchaeology? Furthermore, what are the current and emerging new challenges for practicing geoarchaeologists as relevant for today's concerns of sustainable development, values of landscapes as heritage resources, and the place of human societies within a changing environment?

[111] Forum · ARCHAEOLOGY PODCAST NETWORK—LIVE PODCAST AND DISCUSSION

Join hosts of the archaeology podcast network in a discussion about podcasting as a tool for public outreach. How can podcasts help archaeologists convey information to other professionals and the public in a way that respects the cultures represented but that is also informative and educational? Are podcasts here to stay? Are they an effective tool for public outreach in archaeology?

[112] Forum · HOW TO DO ARCHAEOLOGICAL SCIENCE USING R*(SPONSORED BY DIGITAL DATA INTEREST GROUP)*

Archaeological science is becoming increasingly complex, and progress in this area is slowed by critical limitation of journal articles lacking the space to communicate new methods in enough detail to allow others to reproduce and reuse new research. One solution to this is to use a programming language such as R to analyze archaeological data, with authors sharing their R code with their publications to communicate our methods. This practice is becoming widespread in many other disciplines, but few archaeologists currently know how to use R or have an opportunity to learn during their training. In this forum we tackle this problem by discussing ubiquitous research methods of immediate relevance to most archaeologists, by using interactive, live-coded demonstrations of R code by archaeologists who program with R. Topics include getting data into R, working with C14 dates, spatial analysis and map-making, conducting simulations, and exploratory data visualizations. Forum participants will be able to participate by following along with the live-coding on their own laptops (current versions of R and RStudio must be installed in advance; both are free), and discussing applications of the methods presented with the discussants.

[113] Poster Session · ARCHAEOLOGY IN EAST ASIA**[114] Poster Session · HUMAN, ANIMAL, AND ENVIRONMENTAL INTERACTION IN NORTHEAST ASIA**

Since the last Ice Age, Northeast Asia witnessed a variety of dramatic and important changes in human societies and their relationship to the environment. These include the Neolithic transition, the adoption of domestic livestock, the emergence of horseback riding, and the development of complex nomadic polities. This session will present current archaeological research from Mongolia and adjoining regions, with an emphasis on how interactions between humans, animals, and the environment shaped important social changes in prehistory.

[115] Poster Session · BIO-CULTURAL APPROACH TO THE OSTEOARCHAEOLOGICAL INQUIRIES IN CHINA

Osteoarchaeological research in China has traditionally focused on questions of population affinity to investigate the relationships among ancient groups. While such studies have produced valuable information on past populations, one result has been to stress the biological over the bio-cultural interpretation of the human past. The aim of this session is to provide more nuanced explorations of health, disease, and behavior through contextualized bioarchaeological analyses of human skeletal remains from a diverse array of environmental and cultural settings in ancient China. Contributors of this session will address questions within the bio-cultural framework that integrates biological data from human remains with their cultural and ecological contexts. Our goal is to offer new perspectives in the study of human adaptation and life-ways in ancient China.

[116] Poster Session · RECENT ADVANCES IN CHINESE ZOOARCHAEOLOGY

Faunal remains have become important materials unearthed from archaeological excavations in China. Zooarchaeological data could provide much information of human-animal interactions in the past, such as animal trading and exploitation, utilization, and domestication. New studies on those recovered faunal remains have used a variety of analytical methods such as morphological measurements, pathological examination, age structure profiling, sex ratio reconstruction, isotopic analysis, and DNA research to target many different questions. This session provides a platform to showcase some of these new studies from China and to demonstrate the power of using new methods to examine old bones for the study of human-animal interactive history of the past in China.

[117] Poster Session · HUMAN LIFESTYLE AND ADAPTATION IN PREHISTORIC CHINA

In recent years, human lifestyle and adaptation in prehistory, and the potential role of environmental changes in those processes, have been intensively studied in China. This session aims to present new findings, ideas, and theories in how and why human adaptation shifted in prehistoric China. This panel will clarify the relations between human adaptation and environmental changes across China and provide suggestions on what research is needed in the future. Researches from bioarchaeology, zooarchaeology, archaeobotany, paleoenvironment, and other related perspectives are warmly welcomed.

[118] Symposium · ARCHAEOLOGICAL SURVEYS IN LIGHT OF NEW TECHNOLOGIES

The focus of the session is to reflect on the nature of information that is/can be captured through archaeological survey, and to explore the interpretative challenges and opportunities that survey information offer beyond simply "identifying sites." We will address these questions in light of the ever increasing adoption of information and computing technology, both in the field and in the lab. Does the adoption of new technology open up new research venues? Are we applying these technologies to resolve old questions perhaps in a more efficient and expeditious manner? Can we identify common trends, and more importantly, gaps in our patterns of use? At which stage of the survey process is technology being used most (e.g., planning, conducting, processing)? How well suited is current technology for the rigors of the field? What aspects of technology (e.g., battery power, processing, connectivity, user interface) are most critical and in what way? To what extent do these, and similar questions, open new interpretative opportunities?

[119] Symposium · ANCIENT MEXICO AND THE LEGACY OF HENRY B. NICHOLSON

Henry B. Nicholson dominated the field of Aztec studies for over four decades leaving behind a vast amount of scholarship. In the decade since his passing, that corpus continues to stand the test of time with many of his works being among the most cited resources in the field. His contributions to ethnohistory, archaeology, and iconography are vast and provide the point of departure for many specialists. It is certainly a legacy worthy of contemplation. This session will unite both junior and senior academics through a series of papers aimed at contemplating just how his legacy continues to impact current research. While this impact has been great on Central Mexican studies in particular, it has also influenced important cultural areas outside the Basin of Mexico including the Gulf Coast and Chichen Itza.

[120] Symposium · THE TULA REGION INTERACTION AND MIGRATION PROJECT (TRIMP): YEAR 1

The tumultuous Epiclassic period in central Mexico has long provided fertile ground for evaluating anthropological, archaeological questions since its original definition over 75 years ago. Recent work in the region has produced new data that are beginning to flesh out and test previously conceived hunches and, in some cases, upending established models of local and regional economic, social, and political relationships and networks. One such project is the Tula Region Interaction and Migration Project (TRIMP), which began its first field season during the summer of 2016. The project combines archaeometric analyses of existing ceramic, lithic, and osteological collections with new excavation at Cerro Magoni, one of the principal political centers of the local Tula region during the centuries preceding the foundation of the Toltec state. Our session reports the results of the TRIMP to date and contextualizes its preliminary inferences within the continuing evolution of ideas concerning central Mexico during the Epiclassic. The papers presented demonstrate the untapped opportunities available in the Tula region in particular, and Epiclassic central Mexico generally, to inform and influence broader anthropological understandings of cross-cultural patterns on multiple scales.

[121] Symposium · MIDDLE PLEISTOCENE SUBSISTENCE IN THE AZRAQ OASIS, JORDAN: PROTEIN RESIDUE AND OTHER PROXIES

Excavations at Shishan Marsh, a former desert oasis in Azraq, northeast Jordan, reveal a unique ecosystem and provide direct family-specific protein residue evidence of hominin adaptations in an increasingly arid environment approximately 250,000 years ago. In this session, we detail the lithic, faunal, paleoenvironmental, and residue data that suggest that Middle Pleistocene hominins were able to subsist in extreme arid environments through a reliance on surprisingly humanlike adaptations.

[122] General Session · TEACHING ARCHAEOLOGY**[123] Symposium · ORIGINS AND TRANSFORMATIONS: THE WESTERN ISLANDS OF THE PACIFIC OCEAN**

Research programs focused on the islands of the Western Pacific Ocean are increasingly dedicated to the analysis of postcolonization processes. Models describing the ecological transformation of islands, demographic changes, and the technological innovations developed by settled populations to maintain social connections over vast distances articulate with ever more discrete spatially and temporally sensitive archaeological analyses to provide a framework to interpret these processes. These studies contribute to better resolution of the development of evolutionary trajectories creating favorable conditions for more complex social organization. This symposium highlights recent studies in a number of archipelagos, including the Marianas, Fiji, Tonga, and Samoa.

[124] General Session · PRESERVING HERITAGE SITES**[125] Symposium · CERAMICS AND SOCIETY AMONG THE CLASSIC MAYA CITIES OF THE WESTERN PETÉN**

This symposium focuses on the ceramic traditions of the Classic Maya cities of the Western Petén. These cities, virtually unknown a decade ago, possess a common, interconnected history. The sites between Central Lakes region and the Mexican frontier, dwelt in apparent harmony, lacking the militarism of other regions of the Classic Maya world, and sharing many artistic and epigraphic traditions. Most apparent is that they shared many aspects of their disparate ceramic traditions, suggesting a significant level of

interaction and exchange. Gift exchange, commerce, and artisan interaction developed throughout the Classic period, creating a shared ceramic tradition. This symposium focuses on these traditions, their differences and their similarities, and the physical vessels themselves that moved through this region. The evidence suggests a unique set of social and political relations between the Maya peoples of the region, one geared for mutual cooperation, rather than the military competition of the Maya world around them. This session will discuss the ceramic record and the social and political implications of this evidence for the cities of El Perú-Waka', La Corona, Motul de San José, La Florida-Namaan, La Joyanca, and other centers inside and outside this region.

[126] Symposium · INVESTIGATING A TEN-MILLENNIA RECORD OF HUNTER-GATHERER LIFEWAYS IN THE NORTHEASTERN CHIHUAHUAN DESERT

The Lower Pecos Canyonlands of southwest Texas contains one of the longest and best-preserved records of hunter-gatherer lifeways in North America. Since 2009, the Ancient Southwest Texas Project (Texas State University) and Shumla Archaeological Research and Education Center have been conducting intensive multidisciplinary research into understanding aboriginal hunter-gatherers in this unique area on the northeastern fringe of the Chihuahuan Desert. Focusing on sites and assemblages ranging from earth ovens and rockshelters to rock art and bedrock features, presentations will highlight research strategies used to investigate the diverse hunter-gatherer record spanning from Paleoindian to protohistoric times in the rugged canyon lands of the Rio Grande borderlands. Investigative approaches include rock art, geoarchaeology, 3D data acquisition, methodology, chronology, paleoethnobotany, and zooarchaeology.

[127] Symposium · BEYOND DOMESTICATION: INVESTIGATIONS INTO THE HUMAN-CANINE CONNECTION

The interpersonal relationships humans have with domesticated dogs have a great influence on the way in which these animals are conceptualized in terms of both their value and social standing within a human group. Once domesticated, dogs filled many different roles within human societies, from beast of burden to food resources to companions. These relationships were likely multifaceted and may not always be easily discernible in the archaeological record. However, new research questions and investigative techniques are beginning to elucidate the ways that humans valued dogs in the past. The papers within this session provide a better understanding of the human-canine relationship through the integration of multiple lines of evidence, including zooarchaeology, ethnohistory, and cutting-edge scientific methods of analysis. By identifying the place that domesticated dogs occupied within a given human society we hope to be able to better understand the value that past peoples placed on this relationship. These works will contribute to broader anthropological discussions about human interactions with their environment as well as the lived experiences of humans and their dogs in the past.

[128] Symposium · MARKETS AND CAPITALISMS IN INDIGENOUS SOCIETIES IN THE COLONIAL AMERICAS

Archaeological studies of colonial encounters in the Americas have increasingly focused on the role of capitalism within European imperial projects. However, this growing attention on capitalism is vulnerable to endless debates over definitions and transitions, potentially resulting in interpretations that tell us more about Eurocentric notions of capitalism than the complexities of colonial economic arrangements. This session asks participants to move beyond trait-based definitions of capitalism in an effort to understand the actual economic practices that emerged from the friction of local colonial encounters. Specifically, we seek to unpack the tangled web of economic relationships that characterized colonial societies, refocusing our analysis on the ways in which indigenous groups perceived, managed, and ultimately captured colonial markets for their own political and economic goals. We examine the diversity of colonial encounters in the Americas (Spanish, English, Russian, French, etc.) as well as studies of continuities and disruptions across prehistoric/historic boundaries. By centering indigenous societies, the case studies in this session move beyond considerations of capitalism as an ideal type, and instead explore the laborers, traders, and consumers directly responsible for the creation of colonial political economies.

[129] Symposium · PREHISTORIC ECONOMIES IN MIDDLE-RANGE SOCIETIES: PAPERS IN HONOR OF KATHERINE SPIELMANN

This symposium honors the scholarly contributions of Katherine Spielmann to the field of archaeology. Mirroring Dr. Spielmann's research interests, this symposium focuses on prehistoric economies in smaller-scale and middle-range societies, primarily in North America. Former students examine a variety of topics on this subject, including the processes underlying economic intensification, the role of feasting and ritual in small-scale economies, and the variety of conditions under which small-scale and middle-range societies with relatively noncomplex political systems develop complex, specialized economies and systems of exchange. Reflecting Dr. Spielmann's interest in human-ecosystem interaction, papers also investigate the long-term ecological changes that resulted from settlement by relatively sedentary farmers in particular environments. The overarching goal is to highlight both the interconnectedness of these themes and the positive impact of Dr. Spielmann's ideas and research on her students and the discipline as a whole.

[130] Symposium · RECENT ANALYTICAL CONTRIBUTIONS TO CHACOAN ARCHAEOLOGY

This session highlights recent studies about Chaco Canyon archaeology which emphasize new research approaches to long-standing questions about the social, economic, and organizational features that characterized the period of emergent complexity associated with the construction of "great houses" between ca. AD 800 and 1200. Contributions especially explore the role of scientific methods, quantitative analysis, and geospatial techniques in addressing a range of critical explanatory issues.

[131] Symposium · LIDAR IN THE MAYA HEARTLAND: RESULTS OF THE 2016 LIDAR SURVEY IN GUATEMALA'S MAYA BIOSPHERE RESERVE

During the summer of 2016, the National Center for Airborne Laser Mapping conducted the first phase of an ambitious lidar survey of over 1,400 km² of forested areas within the Maya Biosphere Reserve (MBR) of the northern Petén district of Guatemala. The project, sponsored by Fundación PACUNAM (a Guatemalan nonprofit organization focused on the research and conservation in the MBR), included areas currently under investigation, including Tikal, El Zotz, Holmul, La Corona, Xultun, San Bartolo, Waka',

Naachtun, and Uaxactun. These are some of the most important lowland Maya centers that flourished throughout both the Preclassic and Classic periods, many of which have been mapped to various degrees of completeness with traditional field methods. The project also targeted areas where only cursory archaeological research has been conducted, such as between the sites of Xmakabantun and Holmul in the northeast and swaths of the Parque Laguna del Tigre in the west. The participants will present results relevant to not only the detection and interpretation of archaeological and environmental features in each coverage area, but also the methodological issues raised during the various stages of lidar data analysis that might prove useful to future applications of this technology in similar environmental conditions.

[132] General Session · ARCHAEOLOGY OF THE MEDITERRANEAN REGION

[133] Symposium · IDENTITY AND CHANGE: ARCHAEOLOGICAL INTERACTION ACROSS ARCHIPELAGOS, INLAND SEAS, AND OCEANS

This symposium examines the emergence, dynamics and change of island societies, linked together in wider coastal and island worlds. Papers address the archaeological evidence for interactions between different communities over time and explore the nature and significance of interactions that emerge as distinct island identities. The symposium seeks to address the changes that take place in islands over long timescales notably between prehistoric and globalized historical societies, taking examples from the central Mediterranean and regions bordering the Atlantic. In many cases, striking new data from recent fieldwork are brought to bear, including isotopes, trade characterization and environmental data. The symposium has deliberately taken examples from seas with different degrees of closure, and where contrasts between early and later maritime technologies can be compared. A key theme of the symposium is the broader political context of island societies and how island communities respond to changing conditions as measured in environmental impact and local development.

[134] Symposium · RE-PENSANDO LA/S MOVILIDAD/ES ANDINA/S: NUEVAS PERSPECTIVAS EN TORNO AL VIAJE, CONTACTO, INTERACCIÓN, INTERCAMBIO Y OBTENCIÓN DE RECURSOS EN LOS ANDES CENTRO-SUR

La movilidad humana es un aspecto fundamental que ha caracterizado a las poblaciones de los Andes Centro-Sur a través del tiempo. A pesar de que durante los casi últimos 40 años diferentes modelos han intentado explicar la movilidad y contacto en el área, ciertas preguntas subsisten con respecto a cómo ocurrió, quiénes se movían, de dónde provenían y por qué viajaban. La mayoría de los modelos propuestos han dado énfasis a la economía y rol de las poblaciones tanto de tierras altas como altiplánicas en el control de la movilidad y pisos ecológicos, principalmente a través de caravanas de llamas en períodos tardíos, actuando de forma homogénea en la región andina. Sin embargo, recientes perspectivas plantean patrones de movilidad particulares asociados a los diferentes grupos e historias/memorias locales que habitaron en la costa, valles, pre-cordillera y puna. El objetivo de este simposio es evaluar desde una mirada crítica y constructiva la movilidad en los Andes Centro-Sur considerando y complementando distintas líneas de evidencia que hasta la fecha han arrojado nuevas luces en torno a ésta temática. De esta manera, se plantea re-pensar los patrones de movilidad desde una perspectiva interdisciplinaria y más allá de la racionalidad económica.

[135] Symposium · ANCIENT METALLURGY IN MESOAMERICA: LOCAL EXPRESSION AND INTERREGIONAL CONNECTIONS

Throughout ancient Mesoamerica, numerous metallurgical and metalworking traditions developed during different time periods, and among different cultural groups. These traditions emerged through a range of cultural influences, particularly from the Andean and Central American metalworking regions, and eventually incorporating Spanish metallurgical technologies. These external cultural connections strongly influenced the development of local metalworking, through the introduction of new technologies, and shifting the focus of local traditions toward new goods and raw materials. Local traditions, however, also developed unique trajectories. This was, as a result of local demand for particular goods and styles, probably also due to their position within interregional exchange networks with relation to raw material sources, or large populations of wealthy consumers capable of supporting specialized artisans. The present symposium will focus on the latest decade of research into local metalworking traditions within Mesoamerica, including the use of copper and copper alloys, gold, and silver. Authors will particularly consider local expressions of artisanal styles and technologies, while also examining shared influences between the various traditions. They will also consider these technologies with respect to the relationships between mining and processing sites, with secondary production sites, and distribution networks.

[136] Symposium · RITUAL DURING PERIODS OF DECLINE, COLLAPSE, AND REGENERATION IN ARCHAIC STATES

The notion of state “collapse” has come under scrutiny recently for both modern and archaic states. A range of specific topics about this issue have been debated including what defines collapse? What predicates collapse? Are some types of states more prone to collapse than others? How do decline and collapse manifest in the political, economic, religious, and social realms? Political and economic factors in the collapse of states, both modern and ancient, have often been the focus of discussion, but religion and ritual are prominent in many of the modern examples of societies declining, collapsing, and regenerating. The frequent prominence of religion and ritual in contemporary situations stimulates questions about the ritual expressions of and responses to decline, collapse, and regeneration in earlier states. By examining the role of ritual in a variety of archaic states, this session will explore how the decline in a state's ability to continue in its current form affected the practices of ritual and in turn how ritual as a culture-forming dynamic affected decline, collapse, and regeneration of the state.

[137] Symposium · MOUNTAIN TOWNS AND CROSSROADS: ARCHAEOLOGY OF THE SIERRA SUR OF OAXACA, MEXICO

The goal of this session is to bring together and share information coming from archaeological research in the Sierra Sur of Oaxaca, Mexico. For over half a century, archaeologists have focused research on the Valley of Oaxaca and the coastal lowlands when reconstructing the complex prehispanic history of Southern Mexico. Often left out of the dominant narrative of ancient Oaxaca, the story of the Sierra Sur is important to consider as it provides a broader context for theories of social complexity, conquest and colonialism, migration, and economics. Emerging narratives developing out of data generated from fieldwork in the Sierra Sur of Oaxaca suggest that we should continue to reevaluate our current narratives, which are based on research primarily from the Valley

of Oaxaca and coastal regions. By bringing together researchers working in the Sierra Sur region, this session will bring attention to this region and enrich our understanding of Southern Mexico as a whole.

[138] Symposium · RECONSTRUCTING INDIGENOUS PRACTICES IN MUSEUM SETTINGS: PERSPECTIVES AND APPROACHES

Museum collections present rich resources for the recovery and reconstruction of indigenous technologies and practices that may have been partially or completely lost in recent centuries. Archaeologists in particular have frequently engaged with museum artifacts in attempts to reconstruct the lifeways, technologies, and histories of indigenous populations. Additionally, anthropologists, curators, conservators, historians, artisans, and craftspeople, all of whom may be members or nonmembers of indigenous communities, have engaged and will continue to engage with the material legacy of indigenous populations in museums. Dialogue among members of these groups is essential to the enrichment and ethical practice of museum research within and beyond the field of archaeology, and we propose this session as an opportunity for the presentation and discussion of methods and techniques of analysis in museum settings; the production, display, and dissemination of knowledge related to past and present indigenous practices in museum settings; the ethical and epistemological concerns that arise with native and non-native engagement with museum collections. The session draws on contributions from specialists in diverse fields and of diverse cultural backgrounds with the aim of furthering common goals in the area of indigenous material-culture studies as well as archaeological engagement with professional and public stakeholders.

[139] Symposium · MANIPULATED BODIES: INVESTIGATING POSTMORTEM INTERACTIONS WITH HUMAN REMAINS

Following death the human body becomes the focus of a diverse range of activities that include, but are not limited to, burial in the earth. The unburied dead include those who receive non-burial forms of funerary treatment and individuals whose remains are intentionally exhumed or unintentional disturbed. Examining the archaeological traces the unburied dead can illuminate the diverse interactions with, and perceptions of, dead bodies and body parts in the past. This session seeks to draw together new research that examines postmortem interactions with the dead including both non-burial modes of treatment and manipulation of human remains. This might involve analysis of human remains from non-burial contexts; studies of funerary treatments of the body that do not culminate with insertion into the ground; or investigation of post-burial activities that result in the exhumation, manipulation, and/or display of human remains aboveground, whether this occurs soon after death or much later. This session aims to highlight potential comparative perspectives across social, cultural and temporal contexts, thereby examining the reasons why, contexts within, and means by which the material body is manipulated after death.

[140] General Session · RECENT PALEOINDIAN STUDIES I

[141] Symposium · A GLOBAL DIALOGUE ON COLLABORATIVE ARCHAEOLOGY

Active collaboration with a wide variety of stakeholders forces practitioners to rethink how and why we do archaeology, indeed even to question what archaeology is and can be. This seminar explores the tenor, breadth, and practicalities emerging from a decade of collaborative practice. Drawing from a wide range of practitioners with different temporal and regional foci, this session takes an international view of collaboration in archaeology. The moderated session presents global collaborative archaeology, both as a challenge to current practice and an impetus for the future. Presenters were asked to grapple with big questions such as

- How does archaeology change with a focal shift from product to process?
- What ontological and epistemological challenges and promises arise in this work?
- How does collaboration destabilize and invigorate method and theory?
- What are the best ways to train a new generation of practitioners in collaboration?
- What changes to institutional structures will be required for collaborative archaeology to reach its full potential?

[142] General Session · THE ARCHAEOLOGY OF FOODWAYS

[143] Symposium · EVOLUTIONARY ADAPTATIONS AND POPULATION HISTORY OF THE ATACAMA DESERT

The Atacama Desert, despite its extreme aridity, scarce water sources, and hostile climate, has been inhabited by humans since the terminal Pleistocene. Encompassing a range of ecological zones from southern Peru and northern Chile, and extending into the altiplano region of Chile, Bolivia, and Argentina, human and cultural remains from the Atacama Desert provide critical data that enrich our understanding of the initial peopling of South America and events that occurred thereafter. Because of Atacama's unique ecology, humans who occupied this region faced challenges that differ from other areas of South America. Thus, this symposium encompasses archaeological and biological research focused on evolutionary adaptations and population movement over 10,000 years of human prehistory in the Atacama Desert and the areas surrounding it. The papers in this symposium present new methodological approaches and theoretical interpretations, including analyses of ancient DNA, dental calculus, isotopes, and 3D morphometrics. Our symposium features a team of international and interdisciplinary researchers whose collaborative goal is directed toward new interpretations on biocultural evolution, foodways, health/disease, and social complexity among prehistoric human lifeways in the Atacama Desert and adjacent regions of South America.

[144] Symposium · ARCTIC AND SUBARCTIC COASTS: CURRENT RESEARCH AND MODERN CHALLENGES

The coasts of the Arctic and Subarctic are dynamic ecosystems, posing challenges to the people who have occupied them, live there today, and the archaeologists who conduct research there. Throughout much of the Holocene they were occupied by diverse peoples who had complex relationships with their environment, as do the people who live in these regions today. This session examines current research focusing on those relationships, from processes of colonization and adaptation to the mitigation of modern impacts on heritage resources resulting from a changing global climate. Archaeologists who focus on the Circumpolar North incorporate a wide array of theoretical and methodological approaches; however, all of them realize the broader importance of the

study of northern peoples and the ecosystems of which they are a part. The papers presented in this session are a sampling of the innovative and challenging projects that focus on northern coasts. They represent the current state of Arctic and Subarctic archaeological coastal research and examine its future.

[145] Symposium · RECIENTES APORTACIONES SOBRE EL ESTUDIO DE LA CULTURA MATERIAL DE SANTA CRUZ ATIZAPÁN, UN CENTRO REGIONAL DEL CLÁSICO TARDÍO–EPICLÁSICO EN LA CUENCA DEL ALTO LERMA

El presente simposio, se enfoca en la valoración de la nueva información generada a partir del análisis de materiales arqueológicos recuperados en exploraciones sistemáticas efectuadas en el sitio de Santa Cruz Atizapán, Estado de México. Los trabajos propuestos en el simposio permiten una aproximación al conocimiento de las materias primas locales empleadas para la manufactura de vasijas cerámicas, así como a la identificación del papel que jugó la cerámica Engobe Naranja Grueso en el sitio. Por otra parte, el estudio de las colecciones óseas sirven para entender algunos aspectos de la vida cotidiana de los habitantes del Alto Lerma durante el Clásico tardío y Epiclásico (450–900 d.C.). Se analizan diversos indicadores arqueológicos a partir de metodologías innovadoras que representan una valiosa aportación para las investigaciones arqueológicas.

[146] General Session · AFRICAN ARCHAEOLOGY I

[147] Forum · GRAPPLING WITH COMPLEXITY: A FORUM IN HONOR OF KATHARINA SCHREIBER

This forum in honor of Katharina Schreiber will address several issues regarding the development and expansion of ancient complex societies. The discussants will address three major topics: 1) the origins and development of complexity on the south coast of Peru, 2) Wari imperialism and the mosaic of control throughout the Andean region, and 3) the cross-cultural impact of Schreiber's work on the study of complex societies in other areas of the globe. The goal is for participants to present certain aspects of their research, reflect on how Schreiber has influenced their scholarship, and generate discussion that will stimulate future research ideas.

[148] Forum · ARCHAEOLOGICAL VOLCANOLOGY

This forum seeks to define the short- and long-term, near- and far-ranging effects of volcanic eruptions on human society throughout history worldwide. Archaeological techniques of data recovery will be considered together with geoscience analyses and sociologically oriented research methodologies. Forum participants circulate papers prior to the SAA meetings; the seminal points in those papers will be presented as discussion points for the forum. The outcome in the first instance is envisioned as a position paper distinguishing this line of research from other disaster archaeologies, noting where analytical techniques differ (e.g., tephrochronology and the use of isochrons) and where shared theories and methodologies are useful. Participants work in various areas of the world where volcanoes have visited extensive damage on populations, but particular attention is also given to far-field consequences. Localized cultural reactions will be examined for “best practice” and avenues will be sought to reach out to both disaster risk reduction research as well as volcanology, and not least to disseminate these insights to policy makers.

[149] Forum · BEYOND DATA MANAGEMENT: A CONVERSATION ABOUT “DIGITAL DATA REALITIES”

In a recent “Introspective Digital Archaeology” blog post, Jeremy Huggett asked frank questions about the feasibility of reusing data that archaeologists archive in digital repositories (see <https://introspectivedigitalarchaeology.wordpress.com/2016/06/29/digital-data-realities/>). Despite years of investment in high-profile digital archive programs, data still sees little reuse. Huggett asks whether data are still too siloed, with too little linking for effective discovery and reuse. If so, what measures can we take to better capitalize on research data management so that data reuse becomes more commonplace? Forum discussants will consider digital archaeology beyond the current status quo of “data management” to better situate the sharing and reuse of data in archaeological practice. Within this theme, the panel will discuss data stewardship and preservation, new pathways for interpretation and science, the place of “big data” in archaeology, public engagement, transparency, public policy, compliance, and improving digital literacy. How do we envision the future of digital archaeological data and what ethical implications should we consider? Given the realities of funding and the structure of academic institutions, are these visions realistic? If so, what do we need to do to get there? If not, how can we adjust our visions to fit with these digital data realities?

[150] Forum · PROFESSIONALS, AVOCATIONALS, COLLECTORS: RECALIBRATING THE RELATIONSHIP

SAA established the Professional Archaeologists, Avocational Archaeologists, and Responsible Artifact Collectors Relationships Task Force in 2016 to define appropriate relationships among professionals, avocational archaeologists, and responsible artifact collectors in light of SAA's Principles of Archaeological Ethics and relevant laws. Chaired by Bonnie Pitblado, the task force solicited a wide range of diverse comments and issued a statement in September 2016 along with proposed action items. Despite decades of mutual distrust, much engendered by misconceptions by all parties and amid the predictable criticism, a surprising range of agreement was found in solicited comments and among task force members. Major themes identified inspired action items that emphasize the need for mutual education and outreach, and that suggest an ethical imperative not to shun but to collaborate with responsible collectors. The forum will discuss themes, ranges of views expressed, and action items proposed.

[151] Poster Session · ARCHAEOLOGY IN WESTERN ASIA

[152] Poster Session · AFRICAN ZOOARCHAEOLOGY

[153] Poster Session · EARLY AND MIDDLE STONE AGE ARCHAEOLOGY IN AFRICA

[154] Poster Session · METHODOLOGICAL ADVANCES IN AFRICAN ARCHAEOLOGY**[155] Poster Session · CURRENT CERAMICS RESEARCH IN THE AMERICAN SOUTHWEST****[156] Poster Session · CENTRAL AMERICA AND CARIBBEAN****[157] Symposium · RETHINKING ARCHAEOLOGIES OF PILGRIMAGE**

At its core, pilgrimage is a relational phenomenon. Firsthand accounts of these sacred journeys reveal that humans, otherworldly beings, landscapes, objects, memories, and more move and assemble in various ways that often have profound historical effects. Certainly ancient pilgrimages and the convergences they instigated were equally efficacious. Most archaeologists, however, focus on identifying material traces of pilgrimage activities, and attempts to understand the role of pilgrimage in economics, politics, religion, and social life typically result in functional or structural explanations. Simply put, pilgrimage is conceived as a way to maintain social equilibrium or as part of an underlying social blueprint, and its relational underpinnings are unexplored. The primary idea of this symposium is that the relationships a pilgrimage instigates are the source of the journey's effectual power. Thus, the goal is to focus on how these connections occur and alter the social world. Participants are encouraged to engage with recent theories of phenomenology, animism, relationality, movement, and affect and use multiple lines of evidence to tackle these issues. Overall, the intent is to reinvigorate archaeological studies of pilgrimage using newer social theories.

[158] Symposium · THE LIMITS OF "LANDSCAPE": ALTERNATIVE ARCHAEOLOGIES OF SPACE

The classical notion of landscape is strongly tied to western thought—and more particularly to northwestern Europe, where it developed during the Middle Ages within a specific context of people's relationship to the land. It is furthermore closely related to the history of visual representation (including the invention of perspective and cartography), enlightenment science, and Western convictions about human-nature relationships. In this setting, the landscape came to refer to a sense of territoriality, visual perception, and domination over nature (and others). However, we can safely assume that these values did not characterize human living space in the same way or to the same degree in deep history and/or other regions of the world. In accordance with recent trends in archaeological research and interpretation, we are exploring critical reformulations of the landscape concept (e.g., "taskscape," "maritime landscape," "soundscape" etc.), as well as alternative notions (such as connectivity, heterotopia, liminality, etc.) that may better fit the spatial and cultural realities of distant societies, both in time and space. The classical landscape concept has its limits from a historical, cultural, and intellectual point of view, and it is an explicit aim of this session to explore these limits and cross boundaries.

[159] Symposium · BEYOND (BETWEEN, WITHIN, THROUGH) THE GRID: THE CONTOURS OF MAPPING AND GIS IN HISTORICAL ARCHAEOLOGY

Geographic Information Systems (GIS) are powerful tools available to archaeologists. This session explores the myriad ways in which GIS not only represents findings, but also generates new data and research questions to answer methodological and theoretical problems in archaeology. As Robb and Pauketat (2013:9) argue, archaeologists have "yet to break the scale barrier," and the challenge to keep in view both macroscale and the microscale phenomena remains. As part of our discussion of GIS, this session therefore aims to explore how archaeologists consider scale, place, and space in their use of GIS. Further, we are also interested in how archaeologists incorporate time, which has often presented a challenge for archaeologists using GIS, into their analyses. This session is broadly focused on the use of GIS to generate new questions and data. Within this general theme, topics may include novel uses of GIS; postcolonial geography; problems of scale; movement and migration; representations of time and space; embodied mapping; indigenous mapping; and the politics of representation that reemerge with visualization tools.

[160] Symposium · THE PISGAH CULTURE AND MISSISSIPPIAN ADAPTATION ON THE APPALACHIAN PERIPHERY

As recent Mississippian studies have recognized, the processes of integration and adaptation that characterized the expanding Mississippian frontier from A.D. 900 to 1500 was distinctly heterogeneous. The Pisgah culture of the Appalachian Summit in western North Carolina offers a unique opportunity to consider the range of factors that influenced variation in the process of Mississippianization. Pisgah's unusual mountain environment makes it an unlikely candidate for the maize-based surplus economy so often associated with Mississippian societies, and the relatively late adoption of Mississippian practices within some Pisgah communities begs the question: why did local communities in the Appalachian Summit undergo Mississippianization? This session invites participants to present evidence on various archaeological aspects of Pisgah culture. Specifically, by considering how Pisgah compares to its neighbors in the South Appalachian Mississippian tradition, we aim to understand how cultural interactions and the limitations of the natural environment both shaped the prehistoric landscape and paved the way for subsequent colonial encounters.

[161] Symposium · COMPLEXITY IN SUB-SAHARAN AFRICA: ARCHAEOLOGICAL AND ETHNOARCHAEOLOGICAL APPROACHES TO LANDSCAPE, CRAFT, AND TRADE IN THE PAST 3,000 YEARS

(SPONSORED BY SOCIETY OF AFRICANIST ARCHAEOLOGISTS)

This session explores archaeological and ethnoarchaeological approaches to the study of the foundations and unfolding of social complexity in sub-Saharan Africa through the interconnections of landscape, craft, and trade in the past 3,000 years. In this period, iron technology was established across the continent, agriculture spread, complex polities rose and fell, and African participation in global trading networks intensified. Landscape is used here broadly to contextualize these developments. Papers address the coevolution of early farming landscapes in the early Iron Age; how social identities were produced in village, community, and regional spaces over time; and monumental construction. Local, regional, and global trading networks moved and connected people and products across vast distances. Global trade extended into Africa's interior impacting local economies and the structure, nature, and scale of authority and power. Social inequities based in the production and consumption of prestigious and mundane craft

products emerged and many contemporary artisans continue to work within social structures of inequity while contending with market globalization.

[162] Symposium · INTERDISCIPLINARY APPROACHES TO STUDYING HUMAN SOCIAL DYNAMICS: A CASE STUDY FROM SOUTHERN BELIZE

From 2008–2011 the NSF-HSD funded project (Development and Resilience of Complex Socioeconomic Systems: A Theoretical Model and Case Study from the Maya Lowlands) employed interdisciplinary approaches to explore the intersections human and ecological dynamics in the development and disintegration of a complex polity during the Maya Classic Period. The goal of this project was to model human behavior in the context of climatic and environmental change over a 2,000-year period, drawing on archaeological, paleoclimate, and paleoenvironmental proxies as well as longitudinal ethnographic studies of human decision making in a small agrarian community. Our data suggest multiple scales of interaction between socioeconomic complexity, population growth, and development of anthropogenic landscapes. Papers in this session will present data on land use, settlement patterns, climate and landscape histories, and polity development and decline, as well as strategies for engaging in cultural and environmental heritage educational programs in descendant communities.

[163] Symposium · INVESTIGATING INTERACTION FROM TUNACUNNHEE TO TALAJE: PAPERS IN HONOR OF RICHARD W. JEFFERIES

Spanning the Middle Archaic to the Mission periods, the wide-ranging work and research of Richard W. Jefferies is united by a common theme of interaction. From the study of bone pins among hunter-gatherer groups throughout eastern North America to his work on the Spanish missions of San Jose de Sapala and Santo Domingo de Asao/Talaje, a core theme of Jefferies's work has been the examination of how individuals and groups engaged with one another through material culture and what that meant for larger cultural processes. In particular Jefferies's study of carved bone pins was foundational in that it took a neglected artifact category and used it as a proxy to examine regional questions of interaction at multiple scales. Papers in this session take as their inspiration the work of Richard W. Jefferies and engage with the theme of interaction across the Eastern Woodlands.

[164] Symposium · ARCHAEOMETALLURGY OF THE NEW WORLD: CURRENT RESEARCH, APPROACHES, AND METHODS

Metallurgy and metalworking first emerged in the Andean region of South America, and appear to have progressively spread northward along the continent, as far as Mesoamerica, developing into local technological traditions. Copper, silver, and gold as well as different alloys comprised of these and other metals, were fashioned as ornaments used in religious ceremonies and for the enhancement of elite cultural status as well as more mundane items. In the last few decades, important aspects of the production, distribution, and use of such goods in different regions of the Americas have been inferred by scholars, often from combinations of ethnohistorical, archaeological, and archaeometric data. This symposium attempts to explore research developments comparatively in archaeometallurgy of the New World, departing from studies of diverse nature, including ore sources, mining technology, mineral processing, and extractive metallurgy as well as the social and technological choices that governed metallurgical production in different regions in the Andes, the Intermediate Area of Colombia and Lower Central America, and Mesoamerica.

[165] Symposium · UPPER PALEOLITHIC TRANSITIONAL “MOMENTS” ON THE IBERIAN PENINSULA

Anthropologists have a long-standing interest in understanding cultural continuity and change. Modern research in Upper Paleolithic archaeology has a legacy in cultural-historical research, which focused on defining cultural periods based on unique artistic styles or tool types. These periods form the basic lexicon that archaeologists use to characterize Upper Paleolithic adaptations. Recently, Upper Paleolithic researchers have shifted focus to transitional “moments” in prehistory, where they have incorporated precise radiocarbon chronologies, environmental reconstructions, and robust analytic modeling techniques in order to document cultural changes (i.e., from Gravettian to Solutrean). This session will focus on one European Upper Paleolithic region—the Iberian Peninsula—as a case study for how archaeologists can address long-term cultural continuity and change. The session's contributors will discuss how Upper Paleolithic behavioral transitions were influenced by several interrelated factors: (1) global climatic and local environmental change, (2) regional and subregional cultural adaptations, (3) demography, and (4) inter-regional interactions with groups who resided within Iberia and in adjacent regions (e.g., the French Pyrenees). Overall, this session will distinguish Iberian cultural adaptations and transitions in relation those in other European Upper Paleolithic settlement areas.

[166] Symposium · CONNECTIVITIES IN PREHISTORIC AND CLASSICAL WEST/CENTRAL MEDITERRANEAN

The prehistoric and classical Mediterranean world were alive with small-scale interconnections, but archaeology still focuses on the macro themes of large-scale societies (Greek, Phoenician, or Roman) who divided up the Mediterranean between them. These are of course important, but often neglected are the micro connections that took place within and between the different local prehistoric and protohistoric communities which can provide a more nuanced flavor of the myriad of complex interactions that took place in the network of ancient activities. Moreover, connectivity is often used only to describe maritime contact between islands and landmasses, and while, for the Mediterranean, it is important to understand contact by sea, the mountainous landscape of many of the Mediterranean areas, cut by rivers or broken by plains, also provide possibilities for connections and are fruitful geographies for investigation. In this session, focusing on the lesser-studied western Mediterranean we want to encourage comparative, localized perspectives and—at the same time—break down the prehistoric-historic divide that often hampers research in this area.

[167] Symposium · ARCHAEOLOGY OF INDIA

Postcolonial Indian archaeology has typically conformed to a north-centric narrative of Indian history, as is reflected in the intensity of archaeological study of the Indus Valley Civilization in northern India and in Pakistan. While fruitful, this narrative has obscured wider examination of archaeological phenomena across India. This session aims to shed light on the lesser-known archaeology of India. Since the 1970s, Indian archaeologists have increasingly thought of archaeology as a means of generating information on Indian history and have thus sought to further the documentation and collection of archaeological data across India. These interests

coincided with the acceleration of natural resource extraction initiatives and the increasing frequency of road, power plant, and dam construction. Large-scale building projects often resulted in the displacement of local communities and the destruction of archaeological and historical sites. To that end, this session invites papers that collectively reflect the full scope and diversity of current research on archaeological phenomena from throughout the whole of Indian history, broadly defined, and across the entire Indian Republic. Papers that employ spatial methodologies are especially welcome.

[168] Symposium · GLOBAL PERSPECTIVES ON THE ARCHAEOLOGY OF RITUALLY MOUNDED LANDSCAPES

Mounds constructed of all sorts of materials (stone, earth, shell) in myriad forms have attracted archaeologists from the very foundations of the discipline. From some of archaeology's most famous sites to humble features barely noted on the landscape, mounds offer opportunities to examine past behavior from a variety of perspectives. One consensus that appears to emerge in the archaeology of mounded landscapes is that these features are often constructed in relation to "ritual" of some sort. Yet ritual remains a remarkably slippery concept in archaeology. The meanings, symbolism, and contexts of these mounds often necessitate a detailed reading of the landscape and associated settlements and ecologies. This session pulls together recent archaeological research on mounded landscapes from around the world to examine some of the theoretical and methodological approaches currently being used to explore concepts of ritual in past societies. Specifically, case studies will explore the ritual activities in the past that resulted in the construction of the mounded landscapes that now form part of the archaeological record.

[169] Symposium · CONNECTING MIDDLE PALEOLITHIC DATASETS: THE INTERPLAY OF ZOOARCHAEOLOGICAL AND LITHIC DATA FOR UNRAVELING NEANDERTHAL BEHAVIOR

Stone tools and butchered animal bones are the two main categories of archaeological remains from Middle Paleolithic sites. Both provide distinctive insights into Neanderthal behavior. The aim of this session is to explore the interplay of these datasets; how can they inform on each other and in what ways can they be integrated? Firstly, we invite presentations with a strong methodological focus, assessing how faunal remains can directly inform on lithic technology and vice versa (e.g., cutmark morphology, damage signatures, use wear). Secondly, we would like to discuss new and existing taphonomic and behavioral models that have been based on the integration of faunal and lithic data, including theoretical constructs, archaeological applications, and site-based and regional studies. Suggested topics include, but are not limited to,

- Taphonomy (e.g., spatial distributions, fragmentation, weathering, artifact condition)
- Site use, occupation duration, and exploitation intensity
- Linking lithic and faunal diversity, mortality, and seasonality (incl. prey choice, hunting technology, carcass processing)
- Mobility patterns (e.g., isotopes, raw material sourcing)
- Identifying region-, time-, or environment-specific behavior

We want to provide a forum to discuss ideas, approaches, and models that can then be further developed to be published in a special journal volume.

[170] Symposium · AD 600 CULTURAL AND ENVIRONMENTAL TRANSFORMATION IN ANCIENT PERU

In Peruvian archaeology AD 600 has been recognized as a period of important social and environmental transformations, which chronologically has served to mark the end of the Early Intermediate Period and the start of the Middle Horizon, characterized by the demise of archaeological cultures such as Moche and Nasca and the appearance of Wari material culture in the coast. Recent research centered on this time period has confirmed that important climatic oscillations, such as the presence of an El Niño event of considerable proportions, characterized this moment. Likewise, this research is showing a longer presence of Early Intermediate Period societies in different parts of the Peruvian coast. This session proposes to reevaluate this period from different regions, focusing on the varied political, cultural, religious, and environmental responses triggered by this context. Among these responses are the exploitation of water resources for the construction of new settlements and the enlargement of irrigation systems, as well as the aggrandizement of local elites in different parts of the Peruvian coast. Likewise, this session proposes to reexamine the validity of current chronologies, particularly in relation with the end of the Early Intermediate Period and the beginning of the Middle Horizon.

[171] Symposium · AN HISTORICAL ECOLOGICAL APPROACH TO THE INVESTIGATION OF EARLY SOCIAL COMPLEXITY IN THE HORN OF AFRICA: FIRST STEPS

(SPONSORED BY EASTERN TIGRAI ARCHAEOLOGICAL PROJECT)

Papers will present preliminary results of a new investigation initiated by the Eastern Tigray Archaeological Project (ETAP). We have formed a transdisciplinary research partnership between Simon Fraser University, Addis Ababa University, and the University of Kansas, which will integrate the work of archaeologists, paleoenvironmentalists, and ethnoarchaeologists. We aim to blend scientific and traditional knowledge to understand human-environmental interactions taking place at two critical points in the later prehistory of the Horn of Africa: the origins of social complexity during the Pre-Aksumite period (c. 1600–800 BCE) and the Pre-Aksumite to Aksumite transition (c. 400 BCE–CE100). Papers will focus on integrating: archaeological studies on ceramics, lithics, grindingstones, zooarchaeology, and archaeobotany; paleoenvironmental investigations of stable isotopes, soil micromorphology and soil charcoals; and studies of traditional farmer adaptations to environmental stress, completed within a framework of historical ecology.

[172] Symposium · ARCHAEOLOGIES OF HEART: EXPLORING THE ROLE OF EMOTION AND SPIRIT IN ARCHAEOLOGICAL RESEARCH AND PRACTICE

Feminist and indigenous models of research and wellbeing invite us to fully utilize our emotional, social, intuitive, and spiritual selves, as well as our best intellectual and rational selves, in our research pursuits. In this session, we propose to explore "Archaeologies of Heart," in research practices, pedagogies, and outcomes. What propelled this session was our asking, If we all love archaeology so much, why don't we talk more explicitly about our feelings? Why don't we get our hearts involved in our work and research in more than an implicit manner? Our collective goal is to find and speak our unique and authentic voices about issues

in our discipline that matter to us and to develop means by which we can begin to transform archaeology to incorporate our whole selves, from the individual to the community, classroom, and institutional levels. Drawing on the growing literatures on heart-centered practice, indigenous ontologies, and feminist perspectives, we invite our panelists to consider and reflect on questions and concerns: What are heart-centered practices? What do they look like, and how would they translate into archaeology? What would be the outcomes of a heart-centered archaeology? How might it change the interpretations we make about the past?

[173] Symposium · THE SCIENCE OF ORGANIC RESIDUE ANALYSIS AND THE ART OF CULTURAL INTERPRETATION I
(SPONSORED BY SOCIETY FOR ARCHAEOLOGICAL SCIENCE and PALEORESEARCH INSTITUTE)

For those interested in the analysis of archaeological organic residues (biomolecular, micro-, and macroremains), our primary interest is in the development of public and professional presentations to bridge the gap between the science and the significance behind the data. Because many chemical and morphological methods are complex and unfamiliar to scientists and laypersons alike, explaining the rigor and the validity of the methodology often dominates the presentations. The cultural implications of the findings are oversimplified. We challenge researchers to create presentations that are suitable for the general audience, where the method and the interpretation are given equal weight. We encourage the use of creative, well-constructed, and easily understood visuals. We also welcome presentations that target specific age groups, such as high school and secondary education forums. The cultural interpretation should extend beyond the past and reach into the present—how well can a general audience understand the method and the meaning of the research? We hope that the papers produced for this session will be subsequently presented in academic and public forums. Our goal for this symposium is that it becomes an exercise in communication that increases the relevance of archaeological work and its accessibility to the public.

[174] Symposium · THE USE OF PLANTS IN ANCIENT RITUALS: NEW PERSPECTIVES FROM PALEOETHNOBOTANY

It is only recently that systematic paleoethnobotanical studies have begun to be adopted as key components in the study of ancient ritual practices. This approach represents an important innovation for highlighting the role of the “natural world” in ceremonies of the past, as well as providing an additional perspective for understanding the ancient worldviews that were embodied in such practices. Paleoethnobotanical approaches also constitute a key tool for reconstructing the *chaîne opératoire* of the deposits that result from ritual practices, particularly when compared with other associated artifacts and ecofacts. Fine-scale analysis of archaeobotanical remains from ritual contexts has already proved essential for reconstructing the behaviors and often meticulous actions involved in the construction of ritual sequences. This analytic approach thus represents an essential stage for achieving a broader understanding of the sociocultural, political, and ecological aspects of ritual practices. Our symposium aims to present and discuss new theoretical and methodological approaches in the study of ancient ritual practices in the Americas that are symbolically or materially related to the vegetal world.

[175] Symposium · METHODOLOGY AND INTERPRETATION IN THE ARCHAEOLOGY OF ROCK ART
(SPONSORED BY ROCK ART INTEREST GROUP)

In the pursuit of innovative instrumental technique, enhanced interpretive insight, and successful approaches to preservation, this Rock Art Interest Group sponsored symposium is intended to provide a context within which recent archaeologically informed rock art research can be shared.

[176] Symposium · TSIMSHIAN ARCHAEOLOGY: 50 YEARS OF RESEARCH AND 10,000 YEARS OF HISTORY

Modern archaeological research began in the Prince Rupert Harbour area of Tsimshian Territory in 1966 with research from the National Museum of Canada (now the Canadian Museum of History) and supported by Tsimshian people and their governments. This work framed archaeological research across Tsimshian territory including the lands of the Nine Tribes (Metlakatla and Lax Kw'alaams), Kitsumkalum, Kitselas, Gitxaala, Gitksan, and Gitga'at and developed the careers of many of the luminaries of archaeology and related fields. Their research and that of the generations of scholars they mentored have been at the forefront of interpretive and methodological developments and have advanced the understanding of Tsimshian archaeology and history. This session brings together case studies of leading edge genomic analysis, household archaeology, oral history analyses, paleoenvironmental reconstructions, ethnographic comparisons, Indigenous critique, spatial analysis, and radiocarbon modeling, showcasing the legacy of a half century of partnership between different disciplines and communities in one of the world's most well-known research programs.

[177] Symposium · SEEDS OF THE PAST, SEEDS OF THE FUTURE: PAPERS IN HONOR OF STEVEN A. WEBER

Archaeology has the potential to inform us about how humans have found sustainable solutions to challenges such as climate change, overpopulation, and environmental degradation. Through the study of long-term adaptations in human subsistence, ethnobiology is uniquely poised to understand how humans met (and can continue to meet) challenges in their food supply. Dr. Weber founded the Society for Ethnobiology and has worked extensively throughout South and Southeast Asia: areas where his worked enhanced our understanding of early subsistence systems but also provided key examples of how modern food systems can benefit from an understanding of the deeper past. Papers presented in this session take a worldwide approach to honoring Dr. Weber's contributions to making our understanding of past human subsistence relevant to the future.

[178] Symposium · UNRAVELING SOCIAL DYNAMICS THROUGH ARCHAEOLOGICAL SCIENCE

Social archaeology and archaeological sciences are expanding and innovative fields of archaeological research that do not collaborate as often as they could or should. Their potential for intellectual cross-fertilization is significant, but still underexploited. The aim of this session is to illustrate how the methods of the archaeological sciences (a.k.a. archaeometry) can be used to address issues beyond subsistence and technology, in order to explore the social dynamics of past populations. Concepts such as agency, body, identity, gender, household, memory, symbols, power, and materiality often serve as the bonding element between the material and social dimensions of landscapes, sites, and artifacts. This session will bring together archaeologists who dissect the

social dimensions of past societies using these concepts and methodologies, regardless of the time period, geographic area, or theoretical framework they navigate in. Our intent is to create an open and inspiring discussion on scientific ways to unravel ancient social dynamics.

[179] Symposium · QUINTESSENTIAL PLACES: ANALYZING THE CHARACTER OF PRECOLUMBIAN SITES

Settlements of all sizes are quintessential, or have distinctive traits that help to characterize and distinguish them. Papers will analyze the quintessence of places from Native North America through the Andes and query what makes a site distinctive. Previous archaeological and art historical analyses of place may have incorporated these aspects, but perhaps not under the rubric of "quintessential." Distinctive traits may be attributable to topography, plan, geological features, visual culture, inhabitants, and practices such as rituals and social interaction. Such traits may be tangible or intangible, isolated, or intersecting. Above all, quintessential places are sites of dwelling and experience that are shifting rather than static. Quintessential places are not unlike the Roman *genius loci* ("spirit of the place"), with orientation, identity, and experience substituting for spiritual aspects of Roman spaces. Orientation may be directional or spatial, and overlap with identity. Identity also may be embodied in land use, architectural and artistic styles, and imagery. Experience can include movement, rituals, climatic and astronomical phenomena, and social and filial interaction. In addition, scale, authenticity, narrativity, interiority, and place as an ecosystem encompass the character of a place.

[180] Symposium · SAILING AT THE EDGE OF TIME: GLOBAL PERSPECTIVES ON ISLAND COLONIZATION

(SPONSORED BY JOURNAL OF ISLAND AND COASTAL ARCHAEOLOGY)

The timing and drivers of colonization into previously uninhabited areas is a central theme in archaeological research. Questions of when, who, and from where remain important research topics in many regions as these form a baseline from which we construct explanations of the past. Islands provide a particularly rich setting to study colonization as reaching them often involved unique adaptations, including specialized watercraft, translocated domesticates, and long-distance interaction networks. However, the intricacies of colonization are often contentiously debated, as archaeological, linguistic, paleoenvironmental, and biological perspectives can present substantially different and sometimes conflicting information, particularly regarding the timing of initial island settlements. This symposium brings together archaeologists from island regions across the globe to discuss current theoretical, substantive, and methodological issues in island colonization research.

[181] General Session · RECENT ZOOARCHAEOLOGICAL RESEARCH I

[182] Symposium · MAYA HIGHLAND AND PACIFIC COAST ARCHAEOLOGY: NEW DATA, DEBATES, AND DIRECTIONS PART 1

Recent archaeological investigations in the Highlands and Pacific coast of Guatemala and Chiapas, combined with major chronological revisions, are challenging traditional characterizations of this complex region of Mesoamerica and fueling new debates and correlations with neighboring regions. In this symposium, case studies picked from a broad range of subregions will serve to highlight this complexity, while also focusing attention on a number of key themes, including stability and change, inter- and intra-regional interaction, and community and ethnic identity. Researchers will discuss the theoretical, methodological, and technical approaches they are using to address these topics and present new data derived from recent analyses of material culture, sculpture, architecture, and settlement patterns. The symposium will serve to update scholars from neighboring areas of Mesoamerica on recent research, and will also stimulate increased communication, collaboration, and data-sharing among current regional and subregional specialists.

[183] Symposium · EL HOMBRE, SU ESPACIO, TIEMPO, INTERACCIONES Y ASPECTOS BIOARQUEOLÓGICOS

En esta mesa se expondrán una serie de trabajos recientes en diversas áreas de Mesoamérica, buscando con ello aportaciones importantes en el área del conocimiento de las culturas que trabaja cada investigador, todas ellos con un enfoque bioarqueológico el cual emplea diferentes técnicas de otras disciplinas lo cual permite un conocimiento más integral de los grupos humanos que se estudian; tal como señala Talavera y colab, en su libro *Modificaciones culturales en los restos óseos de Cantona, Puebla*. Un análisis Bioarqueológico publicado en 20011, el análisis bioarqueológico es "una propuesta analítica que incluye técnicas y métodos de la arqueología, antropología física, historia, geología, bioquímica, entre otras, para la interpretación de los restos humanos de las poblaciones pretéritas". Con lo anterior se da la oportunidad a los participantes de ver lo que ocurre y como se trabaja en otras áreas, ya que la mayoría de los investigadores solo nos enfocamos a participar en foros locales o relacionados al área de interés, lo que provoca un desconocimiento de lo que sucede en el resto de las áreas geográficas.

[184] General Session · RECENT PALEOINDIAN STUDIES II

[185] Symposium · BLOOD IN THE WATERS: VIOLENCE IN THE MISSISSIPPIAN AND LATE PREHISTORIC EASTERN WOODLANDS

The Late Prehistoric and Mississippian populations of the Eastern Woodlands were deeply interconnected, engaging in long-distance trade and cultural transmission across great swaths of North America. Groups traded for exotic goods and nonlocal pottery, sharing the iconography that adorned them. They also traded blows; groups like the Oneota, Mississippians, and Fort Ancient engaged in repeated instances of conflict. Archaeological evidence of conflict is represented by the many palisaded villages throughout the region and iconography depicting warrior figures. Bioarchaeological evidence of conflict tells a more nuanced story. Skeletal evidence of trophy taking, injury recidivism, lethal and nonlethal trauma, and patterned victimization reveal that conflict in the Eastern Woodlands was not just an ongoing series of indiscriminate raids designed to kill and capture helpless victims. Instead, some individuals were off-limits and victims fought off attackers. Aggressors performed a multitude of different acts, lethal and nonlethal, on their targets, attempting to injure and kill some, while killing and maiming others. Papers will focus on the nuanced

details of conflict in the Mississippian and Late Prehistoric periods of the Eastern Woodlands, and cover a range of topics including victim identity, types of trauma, and conflict practices as seen through the bioarchaeological record.

[186] Symposium · TEACHING THROUGH THE PAST: ADVANCES IN TECHNOLOGICAL ANALYSIS OF THE ARCHAEOLOGICAL RECORD

Over the last half century, archaeology has continuously adopted new technologies to more effectively study the past, and has grown as a technologically savvy and innovative field. Twenty-first-century archaeologists must not only be skilled in traditional methods of analysis and interpretation of the archaeological record but learn to incorporate a myriad of ever-changing platforms of technology into their skill set. From computer modeling to geophysical survey methods, from high-resolution satellite imagery to chemical analysis of lithics, advances in technology have helped piece together the story of human history and prehistory in ways previously not possible. With greater accessibility and ease of use, technology has become a constant companion to archaeologists both in the field and the lab. It has allowed for the collection, analysis, and comparison of big datasets and encouraged new interpretations of old knowledge. This session will explore a few of the recent advances in technological tools as well as new applications for existing technologies to the field of archaeology.

[187] General Session · STRUCTURE AND SPACE AT MAYA SITES II

[188] General Session · THE ARCHAEOLOGY OF IMMIGRATION AND DIASPORA IN THE HISTORIC UNITED STATES

[189] General Session · DIGITIZING THE ARCHAEOLOGICAL RECORD

[190] General Session · ARCHAEOLOGY IN THE ARCTIC

[191] Poster Session · ADVANCES IN ARCHAEOLOGICAL METHOD AND THEORY I

[192] Poster Session · ARCHAEOLOGICAL APPROACHES TO SYMBOL, RITUAL, AND MEANING IN THE AMERICAN SOUTHWEST

[193] Poster Session · ADVANCES IN ARCHAEOLOGICAL METHOD AND THEORY II

[194] Poster Session · NORTH AMERICA: PACIFIC NORTHWEST I

[195] Poster Session · A LINK TO THE PAST: TEXT MINING AND ENTITY RECONCILIATION WITH THE DIGITAL INDEX OF NORTH AMERICAN ARCHAEOLOGY (DINAA)

The Digital Index of North American Archaeology (DINAA) provides a continuously expanding open-source gazetteer of archaeological data from governmental site file inventories across North America. While visualizing spatial distributions of commonly recorded archaeological attributes across modern municipal boundaries alone can provide unique insights into the past, the expansive utility of an open and linked infrastructure is realized when data are coupled to other web-enabled information systems. Text mining, entity reconciliation, and unique identifiers allow DINAA to interface with publications, archives, museums, scientific journals, and web-enabled genetic datasets. This poster symposium focuses on using DINAA to create and visualize these links to the past with specific examples, including text mining of American Antiquity through JSTOR, and linking archaeological records to published information on ancient DNA datasets through the National Center for Biotechnology Information. The current state of DINAA will be reported with maps and metrics detailing up-to-date North American coverage.

[196] Poster Session · LEARNING ABOUT THE PAST WITH FRAGMENTS FROM THE FIRE: STUDENT RESEARCH ON AN NSF-REU FIELD SCHOOL

Significant population increases, the intensification of craft production, and new forms of agricultural output characterize a major transition between the eighteenth and seventeenth centuries BC on the Great Hungarian Plain. Many archaeologists consider these changes hallmarks of an emerging social class. Yet research from different parts of Eastern Europe suggests that societies were organized in a variety of ways during this regional florescence. This session describes recent investigations into a Bronze Age community buried at the cemetery of Békés Jégvermi-kert (Békés 103) in Eastern Hungary. The project includes an international team of undergraduate students funded by the National Science Foundation Research Experience for Undergraduates Program and the Central European Institute at Quinnipiac University. During the 2016 summer lab season, a team of 11 students conducted independent research projects on a range of datasets from the cemetery and surrounding area, focused on understanding patterns in trade, identity, and cremation burial practice. In this session the students present their findings related to the site, the funerary customs, and how the cemetery population fit into the trade, population movement, and new identities emerging in Bronze Age Europe during the mid-second millennium.

[197] General Session · DISCERNING SOCIAL COMPLEXITY IN THE NORTH AMERICAN ARCHAEOLOGICAL RECORD

[198] General Session · ARCHAEOLOGY IN SOUTHEAST ASIA I**[199] General Session · DEVELOPMENTS IN UNDERWATER ARCHAEOLOGY****[200] Symposium · ARQUEOLOGÍA DE LA SIERRA NORTE DE OAXACA, NUEVOS TRABAJOS DE INVESTIGACIÓN ARQUEOLÓGICA, GESTIÓN COMUNITARIA Y PROTECCIÓN DEL PATRIMONIO CULTURAL**

La Sierra Norte de Oaxaca o Sierra Juárez, ha sido una de las áreas menos exploradas en este estado del sur de México. De raíces zapotecas, esta importante región ha sido foco de atención de investigadores en los últimos años, este simposio mostrará las principales investigaciones que se encuentran desarrollándose en diversos puntos de este territorio montañoso. También es importante presentar cómo los trabajos arqueológicos han ido a la par de un intenso diálogo con las poblaciones que se encuentran allí asentadas, requiriendo de interacción entre diversas instituciones tanto públicas como privadas, logrando avances significativos que nos acercan a una comprensión cada vez más completa del área, de su pasado y de su presente.

[201] Symposium · IN THE MOTHER'S WOMB: ARCHAEOLOGICAL RESEARCH IN CAVES

In the collective imaginary of prehispanic communities of Northwest Mexico, the American Southwest, and Central México, caves hold a very important place. Not only were they used as spaces for shelter or home, they were also used as locations where ancestors rest, where vision quests were performed, and where the walls retain the wisdom and messages of the community in the rock art. This symposium presents recent research on caves as places where human communities interacted, lived, and shared experiences among themselves and with their landscapes.

[202] Symposium · EL EXTREMO SUR/EL EXTREMO NORTE: RECENT RESEARCH ON MOBILITY AND VERTICALITY IN THE PERU-CHILE BORDERLANDS

A long-ignored region between the research hotspots of the Moquegua Valley (Peru) and the Lluta and Azapa Valleys (Chile), the Tacna area is witnessing an explosion of archaeological investigation. With some of the most fertile coastal valleys in the region, the area's long-term connections with the altiplano have long fascinated scholars interested in mobility and the emergence of long-distance connectivity through trade, colonization, and state projects. The participants in the session show how current work is shedding new light on key questions in Andean archaeology concerning mobility, verticality, and identity formation. Beginning with Lavallée's key project at Quebrada de los Burros, the region is emerging as an important location to better understand several classic archaeological phenomena—including the Chinchorro culture, Tiwanaku colonies, and LIP ethnogenesis—as well as develop new methodological and thematic directions in Andean archaeology. The emerging research also pushes up against national divisions in scholarship, providing a case study in the possibilities of finding new ways to understand the past beyond the confines of the modern nation-state.

[203] General Session · AFRICAN ARCHAEOLOGY II**[204] General Session · STRUCTURE AND SPACE AT MAYA SITES I****[205] Forum · WHAT GOOD IS SECONDHAND DIGITAL DATA?**

(SPONSORED BY STUDENT AFFAIRS COMMITTEE)

The archaeological record is a nonrenewable resource. Professional ethics dictate effective preservation and require long-term access to data recovered in archaeological investigations. The goal, of course, is to enable us to build on past efforts through comparative and synthetic research and by new and replicative research using such digital collections. This forum features academic, agency, and CRM managers and scholars who have made digital collections with notable potential for reuse available through tDAR, the Digital Archaeological Record. The participants will describe these digital data collections, discuss how they are organized in tDAR to foster effective reuse, and will highlight suggestions for new research in which they could be reused productively. The forum will be of interest both to those seeking to preserve their data and make them available into the future and to professionals and students interested in reusing the data that are now accessible. The SAA Student Affairs Committee supports this forum topic and is cosponsoring the forum.

[206] Forum · HERITAGE MATTERS: ARCHAEOLOGY AND COMMUNITY ENGAGEMENT THROUGH POLITICAL ADVOCACY

An alarming trend of attacks against publicly funded archaeology, archaeology programs and institutions, and archaeological and cultural heritage sites continues to impact the historic preservation profession. Archaeologists from across the country are responding to these attacks through active involvement with their local communities, legislative sessions, lobbying, and other advocacy campaigns to increase public awareness about the value and importance of archaeological and cultural resources. These forms of advocacy vary among archaeologists and regions and are impacted by the needs and wants of the local community and potential constraints in the professional workplace. A panel of archaeologists who have been participating in diverse advocacy initiatives will share successes, challenges, and lessons learned based on their experiences as government employees, private sector employees, private citizens, and members of professional and avocational organizations and nonprofits, followed by an open discussion.

[207] Symposium · LIVING AT THE MARGINS: ARCHAEOLOGICAL AND ETHNOGRAPHIC RESEARCH ON POST-EIGHTEENTH-CENTURY IRISH AND SCOTTISH RURAL LIFE

Margins, both socially and ideologically, are materially defined by local economic practices and national policies. This session focuses on post-eighteenth-century material life on the margins of Ireland and Scotland, defined in differing ways by researchers, governments, and those living along coastal and upland areas. Archaeologists in this session explore the conception of margins and marginality from a multifaceted framework to interrogate the underlying assumptions about material culture, landscape, place, and economy in "marginal" locations and communities. The study of such porous spaces has revelatory potential to help us understand altered social dynamics. Through case studies, presenters considering the nature of life along the edge, how it is ascribed from different perspectives, and the linkages between the core and periphery.

[208] Symposium · ARCHAEOLOGY OF CULTURAL FLUIDITY IN TAIWAN

From maritime-based foragers to Neolithic farmers and Austronesian pioneers, the prehistoric societies of Taiwan exemplify cultural fluidity—defined as resiliency leading to transformative evolutionary change—as an adaptive strategy. This session offers fascinating case studies that examine cultural fluidity from an evolutionary perspective. Geospatial, archaeological, and artifactual data will be featured as well as updates about emerging discoveries on this unique island and the related Pacific sphere.

[209] Symposium · THREADS ACROSS TIME AND SPACE

These papers take a comparative approach to the study of woven cloth viewed from the perspective of textile materials, tools, and texts available in archaeological contexts. Spatially and chronologically, the papers comprise evidence for cloth production from the New and Old Worlds in both the prehistoric and protohistoric periods. Our approach draws on an anthropological tradition in which cloth has been viewed throughout history for its value as a medium of exchange and gift giving, as a signifier of interaction among societies and cultures, as a means of reinforcing kinship and religious relations and enhancing the authority and power of political elites, or distinguishing between urban vs. rural producers. The papers demonstrate the ways in which these social aspects of cloth are embodied in the making and crafting of textiles, through spinning, weaving, and cross-craft collaboration among allied technologies, such as agriculture and fiber processing and the social and environmental contexts in which their technical aspects of production have developed.

[210] Symposium · NOT JUST GOOD TO SEE: GLOBAL PERSPECTIVES ON SCENES IN ROCK ART

There is considerable temporal and geographic variation in the conventions involved in the choice, rendering, and layout of subjects in rock art. Just as the emergence of naturalism through the application of perspective is said to have created new ways of representing and seeing the world in the European Renaissance so too changes in the ways images of animals were represented with regard to other animals, humans, and non-figurative signs likely testify to changes in the ways prehistoric people experienced the world around them. The purpose of this session is to invite scholars with an interest in the variation of fauna in rock art to explore how we can use comparative studies of rock art to identify key differences in the ways in which people engaged with their natural and cultural landscapes.

[211] Symposium · FEASTS AND RITUAL STRUCTURES: ETHNOARCHAEOLOGICAL AND ARCHAEOLOGICAL PERSPECTIVES

Feasts and rituals are key elements in understanding human cultures worldwide, as foods and material cultures served for feasts and rituals are representing a core of the any cultures. This session combines ethnoarchaeological and archaeological studies to aid in understanding the role of feasting and ritual in the evolution of human societies, particularly focused on transegalitarian societies. The first half of this session presents the results of ethnoarchaeological studies of traditional feasting and ritual in Papua New Guinea and Japan. These studies discuss how feasting and ritual are related to evolution of transegalitarian societies and how they can be identified archaeologically. The latter half of the session explores evolution of feasting and ritual among Jomon societies as case studies.

[212] Symposium · ARCHAEOLOGY AND NEW OR ALTERNATIVE RELIGIOUS MOVEMENTS

New and alternative religious movements make copious use of ancient symbols, beliefs, and practices. From the use of the Egyptian ankh in the Western occult tradition to the creation of Neo-Pagan Druidic orders and identities, these symbols, beliefs, and practices hold potent meanings to those who employ them today—meanings that are grounded in a perceived authenticity derived from their antiquity. The act of reuse, however, resituates and thereby alters the meanings and significance of these things. For many archaeologists, this shift in meaning creates a tension with the representations of ancient cultures as produced by the academy. Our session will explore this tension through analyses of newly creative or appropriative religious and spiritual behaviors involving archaeological materials, as well as the ramifications of these acts for public archaeology.

[213] Symposium · BEYOND TYPOLOGY: CURRENT TRENDS IN CERAMIC ANALYSIS IN CHINA

For many years, the main approach to ceramics from archaeological sites in China consisted of creating ceramic typologies aimed at establishing cultural chronology. While these typologies still provide an important foundation for our understanding of past societies, recent years have seen the rise of new approaches and methodologies in ceramic analysis in China. For example, chemical and petrographic analyses of ceramic pastes are providing insight into production provenances and techniques; residue and use-wear analyses are revealing changing dietary preferences; noninvasive methods such as pXRF are generating new data from objects too delicate or unique to be traditionally sampled. In addition to new methodologies, new theoretical approaches are also shaping the ways in which both recent results and past studies are being interpreted, questioning established typologies and throwing new light on processes of ceramic production and usage as well as changes in and interconnection between different ceramic traditions. The aim of this session is to bring together scholars working in multiple time periods across China to present and discuss their research, thus allowing for a better understanding of emerging trends and techniques in this field.

[214] Symposium · AN INTRODUCTION TO THE SOCIO-ECOLOGICAL ENTANGLEMENT IN TROPICAL SOCIETIES (SETS) PROJECT

The ultimate goal of the Socio-ecological Entanglement in Tropical Societies project (SETS) is to promote the cross-cultural, transdisciplinary examination of the tropical experience, past and present, as a means to explore resilience and vulnerability to changing socio-ecological circumstances. This session presents the results of the initial phase of the research program, which focused on the comparative assessment of data quality and quantity across five principal foci (water management, agriculture, settlement, epicentral capitals, and integrative mechanisms), spanning eight geopolitical “divisions” (Belize, South India, Sri Lanka, Myanmar, Thailand, Cambodia, Java, and both north and south Vietnam). Our detailed literature reviews and comprehensive site visitations—which have so far concentrated on the Classical, or “Charter States” of the various subregions of interest—have also allowed us to generate some preliminary insights into the adaptive capacity of tropical, agrarian-based, dispersed urbanism, with particular reference to key land-use, climatic, economic, and geopolitical transitions.

[215] Symposium · CRAFTING AND CONSUMPTION IN PREHISPANIC MESOAMERICA: A DIACHRONIC PERSPECTIVE/LA PRODUCCIÓN Y EL CONSUMO DE ARTESANÍAS EN MESOAMÉRICA DURANTE LA ÉPOCA PREHISPÁNICA: UNA PERSPECTIVA DIACRÓNICA

Recent research has begun to conceptualize prehispanic handicrafts within a theory of goods. This approach focuses on the social encoding of goods (handicrafts) as gifts or commodities. From a theoretical perspective, the encoding of handicrafts (especially exotic or special items) as gifts has direct implications with respect to social embedding and restricted consumption. Conversely, the encoding of handicrafts as commodities (e.g., regional goods or bulk luxury goods) implies a very different political-economic strategy that privileges much freer production and wider access to products. Thus, understanding the social encoding of goods allows scholars to better apprehend how crafting and consumption figured into or impeded the development of exclusionary political-economic strategies that seek to control handicrafts through social embedding and restricted markets, or more collective political-economic strategies in which political architects seek to develop economic institutions that encourage broad social participation in commercial transactions (e.g., open markets). Accordingly, this symposium seeks to investigate the changing roles of goods in prehispanic Mesoamerica from the Early-Middle Formative through the Late Postclassic and how these roles affected production and consumption in terms of social embedding, commercialization, and collectivity.

[216] Symposium · TRADITIONAL KNOWLEDGE AND LITHIC RESOURCES

(SPONSORED BY PREHISTORIC QUARRY AND EARLY MINES INTEREST GROUP)

Many archaeologists who carry out research on the geological sources of raw materials used for stone tools, pigments, construction materials, or adornments have remarked on the repeated coincidence between these locations and local traditional knowledge. Oral traditions, ethnohistoric documents, and toponymy, for example, regularly contain references to locations where raw materials could be found that would have been useful to people in the past. In addition, there is often a relationship between the sacred or cultural landscape and these extraction locations. This relationship can imbue the raw materials with meaning and power that becomes inherent to the materiality of the objects made from these materials. This session will bring together researchers from around the world that work on several different time periods in order to compare and contrast the traditional knowledge base and the archaeological data on raw material extraction sites.

[217] Symposium · SEATS OF POWER: FUNCTIONAL SECTORS IN MESOAMERICAN PALACES

Power in ancient societies may be displayed in different scales and settings. In some cases economic power involves the concentration of staples, the managing of craft production, or the control of trade routes. Social control may involve the concentration and management of labor for state purposes. Political power is evident in territorial control and state expansion. Symbolic power is often called upon when sanctioning the acts of rulers. Palace structures as seats of power are clear in exclusionary organizations where one dynasty rules a state, but not easy to detect in corporate organizations. Different types of palaces may have been present in ancient complex societies: residential palaces, administrative palaces, and multifunctional palaces. This symposium will explore how archaeologists detect functional sectors within a palatial complex or building in Mesoamerican archaeology.

[218] Symposium · MAYA HIGHLAND AND PACIFIC COAST ARCHAEOLOGY: NEW DATA, DEBATES, AND DIRECTIONS, PART 2

Recent archaeological investigations in the Highlands and Pacific coast of Guatemala, combined with major chronological revisions, are challenging traditional characterizations of this complex region of Mesoamerica and fueling new debates. In this symposium, case studies picked from a broad range of subregions will serve to highlight this complexity, while also focusing attention on a number of key themes, including stability and change, inter- and intra-regional interaction, and community and ethnic identity. Researchers will discuss the theoretical, methodological, and technical approaches they are using to address these topics and present new data derived from recent analyses of material culture, sculpture, architecture, and settlement patterns. The symposium will serve to update scholars from neighboring areas of Mesoamerica on recent research, and will also stimulate increased communication, collaboration, and data-sharing among current regional and subregional specialists.

[219] Symposium · LIFE AND DEATH IN ANCIENT NUBIA: ARCHAEOLOGICAL AND BIOARCHAEOLOGICAL PERSPECTIVES

While often considered and presented in isolation, the archaeological study of mortuary contexts and the bioarchaeological study of human remains should be considered in tandem for broader interpretations of past lifeways. Mortuary contexts and human remains are often the only remaining and strongest evidence of past populations, particularly when ancient settlement sites are inaccessible or absent. This is particularly true for many regions and time periods of ancient Nubia, where without many written sources, the interpretation of Nubia's past relies on archaeology and bioarchaeology. Mortuary landscapes (even those within settlement sites) and human remains of ancient Nubia reflect many cultural and biological aspects of this dynamic civilization, particularly in light of its

ever-changing and complex relationship with ancient Egypt, including population identity, social and political complexity, population mobility and change, the transmission of ideas and material goods, subsistence practices, and disease. The aim of this symposium is to present mortuary evidence from both archaeological and bioarchaeological perspectives to give a broader understanding of culture and identity in ancient Nubia. The contributed papers will focus on the diversity of funerary practices and biological and cultural identity as related to all time periods of Nubian history.

[220] Symposium · NORTHERN SOUTH AMERICA II: MOBILITY, LANDSCAPES, AND SOCIALSCAPES

Archaeological research in Ecuador, Colombia, and Venezuela is often overlooked compared to other areas of South America that have disproportionately captured the public eye, such as the Central Andes and the Amazon Basin. Local groups have demonstrated an impressive interregional mobility throughout time, as well as there being common archaeological evidence of long-distance exchange of materials between the Pacific coast, northern Andes, northwestern Amazon, and the Caribbean Coast, thus indicating highly varied yet intimately connected landscapes and socialscapes. The purpose of this session is to highlight the exceptional archaeological contributions of this diverse geographic region at the northernmost extent of the continent.

[221] Symposium · ONGOING RESEARCH IN EURASIAN ARCHAEOLOGY: ASSESSING THE IMPLICATIONS OF NEW EVIDENCE

This session explores the results of recent archaeological research in Russia, Central Asia, the Caucasus, and the adjacent areas. Nearly three decades of post-Soviet international scholarly engagement have greatly advanced our understanding of Eurasian prehistory and made this knowledge available to English readers. While theoretical perspectives and field methods are constantly being refined, some of the same themes continue to guide regional research. They include pastoralist subsistence and mobility strategies, the global spread of domesticated crops, the origins of the Indo-European languages, technological innovations in metallurgy, and draft animal transport, broad-scale interactions over vast distances, developmental pathways of Eurasia's complex societies. This session brings together graduate and postgraduate scholars working across time periods and research questions to discuss current archaeological projects in the region. The aim of the session is to facilitate the exchange of theoretical perspectives, expertise, and ideas among those involved in shaping the future of Eurasia's past.

[222] General Session · ANDEAN ARCHAEOLOGY

[223] Symposium · INSIGHTS FROM INCREMENTS: ADVANCES IN GEOCHEMICAL AND MICROSCOPIC ANALYSES OF HARD TISSUES

Recent advances in the microscopic and geochemical study of biological hard tissues have broadened archaeological understandings of past human-environmental dynamics, especially in island and coastal settings. Hard tissues that contain macro- and micro-incremental growth structures, such as fish otoliths, corals, coralline algae, teeth, and shells serve as ideal proxies as they record local environmental conditions in their structures as they grow. In addition to past environmental information, the analysis of hard tissues reveals insights into changes to animal populations from climatic stress, as well as resource depletion. When combined with ancillary archaeological evidence, these data can provide new insights into seasonality, sea surface temperature, and paleosalinity, in addition to understanding both long- and short-term patterns of landscape and resource use. This session highlights the interdisciplinary nature of this research, connecting archaeologists, biologists, geochemists, and sclerochronologists to share their latest research and methods in hopes of propelling and strengthening future archaeological investigations of hard tissues.

[224] Symposium · BURNING LIBRARIES: ENVIRONMENTAL IMPACTS ON HERITAGE AND SCIENCE

(SPONSORED BY CLIMATE CHANGE STRATEGIES AND THE ARCHAEOLOGICAL RECORD COMMITTEE)

The past decade has seen increasing concern expressed worldwide about the multiple challenges posed by global environmental change to human heritage and the archaeological record. Rising sea levels, increasing storminess, increasing wildfire, and warming soil temperatures in the circumpolar north and at high elevations are all impacting the archaeological record in ways never seen before. This generation will see the destruction of thousands of sites—some already famous and of recognized heritage value and others that are exposed by one storm only to be destroyed by the next. At the same time, archaeology is increasingly recognized as a global change science that is making significant contributions to resource management, environmental conservation, and more effective scenario building for a genuinely sustainable future. Just as our resources are becoming recognized as a “distributed observing network of the past”—as multiple libraries of Alexandria rich with data for many disciplines—we are realizing the extent and urgency of the threat. Our libraries are on fire right now.

[225] Symposium · ANIMALS AND THE SACRED PRECINCT OF TENOCHTITLAN: BIOLOGY, ARCHAEOLOGY, HISTORY, AND CONSERVATION

After eight field seasons (1978–2016) working at the sacred precinct of Tenochtitlan, the Proyecto Templo Mayor (INAH, Mexico) has recovered an amazing diversity of animal species. As a result, more than 300 species have been identified. The resulting information has been on display to the public in a gallery devoted to fauna in the Templo Mayor Museum and has also been published in numerous studies on biological, ecological, and taphonomic aspects of the animals deposited in offerings. Among our principal conclusions regarding the faunal remains from the Templo Mayor, we can mention a) the presence of species corresponding to six different phyla (Porifera, Coelenterata, Echinodermata, Artropoda, Mollusca, and Chordata); b) the predominance of species endemic to regions quite far away from the Basin of Mexico; c) the scarcity of edible species and the clear interest on the part of Mexica priests in those animals that were attributed with profound religious or cosmological significance; d) evidence of captivity; e) traces of cultural processes for modifying the animal cadavers, some of which may be qualified as “taxidermic” interventions; and f) the use of fauna in offerings to re-create vertical tiers of the universe and with this to configure veritable cosmograms.

[226] Symposium · ALTERNATIVE PERSPECTIVES ON THE PEOPLING OF THE NEW WORLD: A SYMPOSIUM IN HONOR OF RUTH GRUHN, THE “FIRST LADY” OF FIRST AMERICANS STUDIES

(SPONSORED BY CENTER FOR THE STUDY OF THE FIRST AMERICANS, TEXAS A&M UNIVERSITY)

Dr. Ruth Gruhn has long served as a proponent for alternative records and non-Clovis-centric models of the Pleistocene peopling of the Americas. Over her long career she conducted field-based Paleoindian research in the Intermountain West of North America, Baja California, Guatemala, and northern South America, and she became well-known and respected in nearly every country of the Western Hemisphere. The papers in this session commemorate Dr. Gruhn's contributions to non-Clovis Pleistocene archaeologies across the Western Hemisphere, Paleoindian studies in Latin America, and the concept of a Pacific coastal migration. We also celebrate her enduring, selfless role as Paleoindian archaeology's "intercontinental" ambassador.

[227] Symposium · FRISON INSTITUTE SYMPOSIUM: THE FUTURE OF “BIG DATA” IN ARCHAEOLOGY

Archaeology is currently experiencing a new “revolution” toward the use of “big data.” Various research teams worldwide have started to integrate the enormous masses of archaeological data generated since the 1960s into online databases that are openly accessible to the entire profession and public. This enhancement of data accessibility promises to transform multiple facets of the discipline, from the leveraging of CRM gray-literature, to the kinds of scientific questions researchers are able to ask, to the greater involvement of archaeology in interdisciplinary research and public engagement. The nascent turn toward big data approaches means that many of the theoretical and methodological problems/prospects involved with this kind of research must still be critically assessed at project-comparative, international scales. This symposium brings together different big data projects worldwide in order to address many of the outstanding theoretical and methodological problems/prospects and provide a framework for the future.

[228] Symposium · STUDY OF HUMAN ECODYNAMICS AT TSE-WHIT-ZEN, A 2,800-YEAR-OLD LOWER ELWHA KLALLAM COASTAL VILLAGE IN WASHINGTON STATE, USA

(SPONSORED BY ISLAND AND COASTAL ARCHAEOLOGY INTEREST GROUP)

Extensive 2004 excavation of the Tse-whit-zen village, traditional home of the Lower Elwha Klallam Tribe, documented multiple houses spanning the last 2,800 years with exceptionally fine geo-stratigraphic control; faunal samples from 10 L buckets, screened to 1/8" mesh, allow for detailed reconstruction of animal use. Occupation spans several large-magnitude earthquakes, periods of climate change, and a gradual increase in sheltered intertidal habitat. Our geo-zooarchaeological project provides an important case study that adds to developing scholarship in human ecodynamics, which uses archaeological and other multidisciplinary knowledge to study the complex and dynamic interactions between humans and their environment in deep history. The link between social structure and social response to environmental stress has been highlighted in several case studies, but differential intracommunity resilience in the face of disaster has been little studied. Our project addresses this need by examining faunas—foundational resources for any community—to evaluate the resilience of distinct social units in a marine forager community. We model and test the effects of environmental change on animal resources and examine both diachronic and synchronic variation in resource use by social units. Tribal members add their own perspectives on the importance of Tse-whit-zen and the recent archaeological project.

[229] Symposium · THE SCIENCE OF ORGANIC RESIDUE ANALYSIS AND THE ART OF CULTURAL INTERPRETATION II

(SPONSORED BY SOCIETY FOR ARCHAEOLOGICAL SCIENCE and PALEORESEARCH INSTITUTE)

For those interested in the analysis of archaeological organic residues (biomolecular, micro-, and macroremains), our primary interest is in the development of public and professional presentations to bridge the gap between the science and the significance behind the data. Because many chemical and morphological methods are complex and unfamiliar to scientists and laypersons alike, explaining the rigor and the validity of the methodology often dominates the presentations. The cultural implications of the findings are oversimplified. We challenge researchers to create presentations that are suitable for the general audience, where the method and the interpretation are given equal weight. We encourage the use of creative, well-constructed, and easily understood visuals. We also welcome presentations that target specific age groups, such as high school and secondary education forums. The cultural interpretation should extend beyond the past and reach into the present—how well can a general audience understand the method and the meaning of the research? We hope that the papers produced for this session will be subsequently presented in academic and public forums. Our goal for this symposium is that it becomes an exercise in communication that increases the relevance of archaeological work and its accessibility to the public.

[230] Poster Session · ANDEAN ARCHAEOLOGY

[231] Poster Session · SOUTH AMERICA I

[232] Poster Session · SOUTH AMERICA II

[233] Poster Session · SOUTH AMERICA III

[234] Poster Session · EUROPE III

[235] Poster Session · BIOARCHAEOLOGICAL RESEARCH IN EUROPE

[236] General Session · CURRENT RESEARCH IN MESOAMERICAN ARCHAEOLOGY I

[237] Symposium · CASAS GRANDES: ADDRESSING KEY ISSUES OF CHRONOLOGY, CULTURE CHANGE, SOCIAL ORGANIZATION, AND EXCHANGE

Casas Grandes, also known as Paquimé, was one of the largest and most complex sites in northwest Mexico. The culture is characterized by a unique blend of Southwest and Mesoamerican traits, yet it has received far less scholarly attention when compared to its neighbors to the north and south. As such, there are a number of critical issues that require further investigation, including site and regional chronology, settlement and exchange patterns, relationships with outside groups, and the nature of the site itself. The papers in this symposium address these key areas of deficiency through a variety of methodological techniques, including radiocarbon dating, ceramic and lithic analyses, XRF, biodistance, and stable isotope analyses. In so doing, this symposium provides new insight into the prehistory of Casas Grandes, as well as its relationship to surrounding regions.

[238] Symposium · ECOLOGICAL ADAPTATIONS AND NEW FORMS OF PASTORALISM? NEW INSIGHTS INTO HERDING PRACTICES IN THE ANDES DURING PREHISPANIC TIMES

The Andean pastoralism and the establishment of trades between different ecological levels (concept of Andean verticality) are the basis for the emergence of complex societies in the Central Andes. Llamas and alpacas are the only large domestic mammals in the Americas. With the intensification of their breeding, camelids occupied a fundamental economic, social, and religious role in Andean life. Today, camelid livestock are confined above 3,500 masl to the ecozone of the puna or altiplano, while their presence during prehispanic times in other areas (such as the Pacific coast, for example) is attested by archaeological skeletal remains, textiles, and iconographic representation. However, modalities subtending the camelids' adaptation to these different environments, as well as herd and territory management, remain unknown. The objective of this symposium is to document these modalities and the different herding practices by gaining new insights into diet, mobility, location of breeding, and health status of archaeological camelids. These data will allow us to understand how prehispanic societies adapted their practices to the difficulty of the environment, and show that herding practices were varied and not restricted to breeding at higher altitudes.

[239] Forum · ARCHIVING US: COLLECTING ORAL HISTORIES FOR TOMORROW'S HISTORY OF AMERICAN ARCHAEOLOGY

(SPONSORED BY HISTORY OF ARCHAEOLOGY INTEREST GROUP)

When studying early American archaeology, researchers can rely on a rich trove of physical correspondence that grace many archives to understand theoretical and methodological developments in our discipline—and the people and personalities that guided these developments. However, the documentary record is becoming more intangible and ephemeral as archaeologists increasingly rely on electronic communication and social media. As SAA members age and retire, we risk losing those personal insights that are key to contextualizing American archaeology—and writing future histories of the discipline. In response to these critical challenges, this forum focuses on a new oral history project spearheaded by the History of Archaeology Interest Group (HAIG) that is aimed at collecting personal insights and recollections from SAA members at or near retirement, or already retired, and nonmembers who are acknowledged as key to the development of American archaeology. Here discussants will outline this new initiative, share insights on interviewing and recording techniques, and invite SAA members to join in these efforts both at upcoming SAA meetings and regional venues.

[240] Symposium · WHEEL OF FORTUNE: CERAMIC ANALYSIS AND THE STUDY OF TECHNOLOGY, EXCHANGE, AND SOCIOPOLITICAL CHANGE IN THE MEDITERRANEAN AND GREATER NEAR EAST

The ubiquity of ceramics in excavation renders them one of the most productive types of data for the study of social, economic, and political processes in ancient societies. Advances in digital and scientific techniques have supplemented traditional methods of analysis, opening new avenues for exploring larger anthropological questions through ceramic study. The aim of this session is to survey the diverse methods available for the use of ceramics data in research examining economic and political changes and sociocultural phenomena. Topics addressed will include the adoption of new dining customs, the transference of technological knowledge between master potter and apprentice, change and disintegration of political economies, imperial integration of consolidated regions, and the nature of trade systems and their governing political structures. A variety of analytical approaches will be employed within session papers, ranging from chemical and petrographic studies of clay sourcing and production technique, functional use and contextual analyses, and distributional and network approaches to object mobility. This session will incorporate datasets from broad regions of the Mediterranean and Greater Near East from prehistory to the Roman period.

[241] General Session · EASTERN WOODLANDS ARCHAEOLOGY**[242] Symposium · MAKING A “-CENE”: ARCHAEOLOGY, POLITICS, AND THE ANTHROPOCENE**

The concept of the Anthropocene relies on ideas about the human past, the relationship between humans and nonhumans, and the material politics of the contemporary world. Many of the central engagements of archaeology have become objects of concern for other disciplines and new publics. Viewed from archaeology's ongoing engagement with these ideas, the political implications of the turn to (and the contents of) the discussion of the Anthropocene are uncertain. Often these discussions recruit or rely on narratives about the human past and what it can tell us about human nature and our potential futures. This session interrogates how discussions of the Anthropocene in the contemporary moment rely on particular narratives about the past, and how these relate to archaeologists' understandings of the politics of the past and our accounts of politics in the societies we study. Politics, here, is not limited to questions of the polity or political subjectivity, but includes questions of inequalities in access to materials and power, as well as humans' relationship to nonhumans. As such, it draws together a number of strands of recent theoretical interest in archaeology, including symmetrical archaeology, new materialisms, human-animal relationships, and a renewed interest in the archaeology of the political.

[243] General Session · MAPPING THE MAYA WORLD

[244] General Session · ZOOARCHAEOLOGY OF THE ANCIENT NEAR EAST**[245] General Session · “US” AND “THEM”: THE BIOARCHAEOLOGY OF BELONGING****[246] General Session · PUBLIC ARCHAEOLOGY II****[247] General Session · REPATRIATION ISSUES AND OPTIONS FOR MUSEUMS AND COLLECTIONS MANAGEMENT****[248] General Session · RECENT ZOOARCHAEOLOGICAL RESEARCH II****[249] General Session · DATING DEVELOPMENTS IN NORTH AMERICA****[250] General Session · REMOTE SENSING METHODS IN ARCHAEOLOGY I****[251] Symposium · ENVIRONMENTAL REBOUND IN THE PROTOHISTORIC AMERICAS: UNTANGLING CAUSE AND EFFECT**

Archaeological data have demonstrated that prehistoric Americans had considerable influence on the structure of their environments; however, this influence often went unacknowledged by the accounts of European colonizers, who were struck by what seemed to them “pristine” landscapes. One proposed cause for this contradiction is environmental rebound: indigenous populations were so reduced by disease, violence, and other consequences of colonization that there was a rebound of resources to historically observed levels. Although widely invoked as an explanation for the pristine myth, environmental rebound in the protohistoric Americas is not well understood, in part due to the methodological challenges involved in exploring multi-causal explanations. How did disease, warfare, and other aspects of colonization combine to produce demographic change? Was rebound ubiquitous in the Americas? Did it occur after initial contact with non-indigenous populations or only after sustained colonization? In testing for rebound in the archaeological record, how do we disentangle the effects of climate change and in situ cultural change? This symposium will explore these and other challenges in identifying protohistoric changes in environment and subsistence.

[252] General Session · MORTUARY PRACTICES AND FUNERARY ARCHAEOLOGY I**[253] Forum · ADVANCEMENTS AND PROSPECTS IN GEOARCHAEOLOGY TODAY: THE SAA GIG AT 20, PART 3**

(SPONSORED BY GEOARCHAEOLOGY INTEREST GROUP)

In celebration of 20 years of the Geoarchaeology Interest Group (GIG) in the Society for American Archaeology, we seek to clarify the present and future contributions of geoarchaeology, in terms of practical techniques, analytic and interpretive methods, and theoretical approaches. Whether as its own field or hybridized multidisciplinary endeavor, geoarchaeology has grown over the last decades to encompass a multitude of research themes and operational procedures, but what unifies this diversity under the name of geoarchaeology? Furthermore, what are the current and emerging new challenges for practicing geoarchaeologists as relevant for today's concerns of sustainable development, values of landscapes as heritage resources, and the place of human societies within a changing environment?

[254] Forum · RADIOCARBON AND ARCHAEOLOGY: DEVELOPING FRUITFUL COLLABORATIVE RELATIONSHIPS

Archaeologists embraced radiocarbon dating almost immediately upon the validation of the technique, and many of the subsequent developments by radiocarbon scientists related to sample pretreatment, calibration, and statistical analysis have been driven by the needs of this specific community. Despite the close affiliation between these two groups the relationship often remains one of producer and user rather than collaborator, which has led not only to misunderstandings on both sides that create a drain on an archaeologist's limited resources (time and money), but also to limit the interpretative power of ¹⁴C dates. This forum brings together radiocarbon scientists and archaeologists primarily engaged with using radiocarbon dating as a specific research tool for developing detailed site-based and regional chronologies. The session participants will present a few personal thoughts about this relationship, engage in discussion, and answer questions from the wider archaeological community.

[255] Forum · READING BETWEEN THE LINES: CHALLENGES IN IDENTIFYING, DOCUMENTING, INTERPRETING, AND MANAGING LINEAR CULTURAL RESOURCES

Linear cultural resources, such as trails, canals, roads, railways, and transmission lines are ubiquitous across the landscape and pose a unique set of challenges to those who study and manage them. Linear resources can be difficult to identify using traditional survey techniques and large-scale linear resources are more likely to have segments destroyed or significantly altered. Linear resources often require additional research to properly document them, leading archaeologists to question how much of the resource they should record and how much detail they should provide. In addition, one linear resource may be managed by numerous groups, including regulators, volunteers, and for-profit organizations, and it may be associated with any number of other cultural resources along its length. This in turn leads to questions regarding jurisdiction, interpretation, and maintenance, or in some cases, repair. Participants in this forum will discuss some of the challenges they face in identifying, examining, and managing linear cultural resources, offering insights to those practices that have worked well in the past, with the goal of identifying a set of best practices for future researchers.

[256] Forum · DO DATA STOP AT THE 49TH PARALLEL? THE STATE OF ARCHAEOLOGICAL DATABASES DIGITAL METHODOLOGIES, HERITAGE MANAGEMENT, AND RESEARCH COLLABORATION THROUGH CANADA AND THE UNITED STATES

(SPONSORED BY DIGITAL DATA INTEREST GROUP)

Archaeological entities and actors (e.g., heritage offices, laboratories and curation facilities, research groups, and individuals) in Canada and the United States are embracing a wide diversity of digital data management, curation, publication, and security strategies. The resulting mosaic of archaeological information, involving hundreds of different regimes of data structures, software implementations, and management strategies, covers approximately 10 percent of the planet's inhabited landmass (not counting Antarctica) and at least the last 14,000 years of the human experience, and imposes areal boundaries (both intra- and international) that would not be recognized as salient by most past peoples. How can we envision the larger potential for these datasets to be used by archaeologists, other research sciences, and other humanities disciplines? What impediments exist to information reuse (social, legal, ethical, informatics, etc.)? What are existing best practices in the collection, management, and reuse of digital data that may be learned from in different contexts?

[257] Poster Session · ARCTIC ARCHAEOLOGY

[258] Poster Session · NORTH AMERICA: CANADA

[259] Poster Session · NORTH AMERICA: MID-ATLANTIC

[260] Poster Session · NORTH AMERICA: NORTHEAST I

[261] Poster Session · ARCHAEOLOGY IN EUROPE II

[262] Poster Session · INTRASITE SPATIAL PATTERNING AND THE PALEOINDIAN RECORD OF EASTERN NORTH AMERICA

Ethnoarchaeological studies have shown the value of studying human spatial arrangements to characterize group size, group relatedness, subsistence practices, and other economic activities. Over the years a number of Paleoindian sites in eastern North America have been excavated that contain precise spatial data on artifacts and features. These sites range from small ephemeral campsites to larger habitation sites with multiple loci. Through various analyses, presenters in this symposium present ongoing research focused on intrasite spatial patterning. As a whole these studies offer new directions in exploring spatial patterning at hunter-gatherer campsites and contribute to a larger goal of building spatial databases that will allow for future comparisons between sites.

[263] Poster Session · STUDENT RESEARCH IN COASTAL AND COMMUNITY ARCHAEOLOGY AT THE UNIVERSITY OF VICTORIA

Community-driven archaeology is broadening its influence throughout anthropology undergraduate and graduate programs in North America and elsewhere. This poster session invites emerging research contributions from student scholars in archaeological and heritage conservation in coastal British Columbia that highlight how their field-based learning contributes to community interests and priorities. We examine this through two separate Indigenous and non-Indigenous field school settings. Students from the Barkley Sound project have investigated a precontact site in the Broken Group Islands in Pacific Rim National Park Reserve. Their work forms a collaboration with Nuu-chah-nulth First Nation. Students from the Heritage and Historical Archaeology field project conducted research at Emanu-El Cemetery, in Victoria, the oldest continuously used Jewish cemetery in Western Canada. The projects that they have developed and report on here are part of their contribution to the Synagogue and Jewish community. This poster session will explore how student projects can expand contemporary perspectives on the possibilities of community-engaged teaching and research.

[264] Symposium · INTEGRATING FUNCTIONAL ANALYSIS: CONTRIBUTIONS FROM USE-WEAR ANALYSIS WITHIN THE BROADER CONTEXT OF HUMAN BEHAVIOR IN PREHISTORIC NORTH AMERICA

Many studies of lithic technology have utilized the concepts of economy and efficiency but rarely do they integrate direct evidence of tool function in conceptualizations of raw material economy. Similarly, use-wear analysts have produced a body of literature on the function of stone tools but have rarely integrated their results into the larger context of human behavior. Stone tool use wear is often included as a separate section of archaeological reports and conclusions about tool function arising from use-wear analysis are rarely considered in conjunction with functional conceptions arising from tool morphology, assemblage composition, or spatial distribution. Recognizing the overall role that lithics play in complex economies requires a multifaceted approach to tool function. Function is not merely the physical use of a tool, but is contextual and complex, impacted by numerous factors, including climate, subsistence, and settlement strategy, inter- and intragroup communication and competition, demography, and ideology. This symposium is aimed at fostering a more integrated approach to functional analysis; one that utilizes multiple datasets and highlights the wealth of information derived from use-wear analysis when incorporated into broader interpretations of prehistoric lifeways.

[265] Symposium · THE INTERACTION BETWEEN POLITICAL AND ECOLOGICAL FRONTIERS

This session seeks to explore archaeological perspectives on the relationship between ecological and political frontiers. Sometimes, at least, ecological and political gradients may be largely coterminous. Prominent examples might include the pastoralist polities of the Eurasian steppe such as the Xiongnu and the Scythians, and their more agrarian neighbors to the south. In other cases, political

and ecological borders may often be starkly at odds with each other; the Inka Empire, for instance, successfully extended itself across the highly divergent ecozones of the Andes. Yet, even where political frontiers follow ecological boundaries, they only ever do so for a time. The pastoralist-agricultural boundaries of Eurasia were sharp political borders until they weren't—and eventually polities emerged that transcended them. The point then is not to see ecological lines as determining their political counterparts, but rather to recognize that although ecological and political borderlands are always interacting, this occurs in complex and often unpredictable ways. Papers are therefore sought that explore such dynamic interactions between ecological and political frontiers, explicitly set within their historical contexts. The session is intended to be global in scope, and aims to include case studies of polities that vary in both scale and organizational character.

[266] Symposium · ARCHITECTURAL STUDIES IN THE U.S. SOUTHWEST: THEORY, METHODS, AND DATA

This session explores household architecture in the U.S. Southwest/Northwest Mexico by considering methodology, theoretical perspectives, and the strengths and weaknesses of regional datasets. The materiality of the house and the dynamic, recursive relationship between houses and people makes architecture an ideal medium for archaeologists to access the daily lives and practices of people in the past. Household architecture provides insight on social organization, economy, cultural transmission, migration, seasonal movement, and interaction. In addition, architecture provides access to the cultural meanings and cosmological significance attached to place and space. Big datasets present methodological challenges to the analysis of architectural data, but also great promise for understanding large patterns at a regional scale. In addition, theoretical perspectives such as materiality and agency are helping archaeologists reframe their consideration of the house and household. The “communities of practice” perspective has been particularly popular in recent Southwest/Northwest research. These perspectives are changing the way that patterns (or the lack of patterns) in the archaeological record are recognized and evaluated. Papers in this session draw on these themes to present recent research on methodology, theory, and data in the study of architecture in the Southwest/Northwest.

[267] General Session · CURRENT RESEARCH IN MESOAMERICAN ARCHAEOLOGY II

[268] Lightning Rounds · MODELING AGRO-PASTORALISM IN EURASIA

The objective of this lightning-round forum is to explore the theoretical and methodological strategies used by archaeologists to model the emergence and dynamics of agro-pastoral economies across time in greater Eurasia. Agro-pastoralism includes mobile or sedentary herding along with farming and/or management of wild plant resources. A main question we would like to address with this forum is, How, and under what conditions did Eurasian agro-pastoral systems achieve or maintain stability or resilience over time? In the forum, we will compare the vulnerabilities and strengths afforded by different variations and combinations of agro-pastoral demographic dynamics, land use, resource management, and economic strategies across diverse landscapes. We particularly wish to stimulate a discussion of how decision-making on the household, corporate group, or bureaucratic level influences the development of agro-pastoral socio-natural systems over time. The new lightning-round format offers an excellent opportunity to bring together a wide range of current research, and to present, discuss, and compare regional studies of agro-pastoralism that use landscape, historical, or evolutionary approaches. We especially encourage discussion of how research into agro-pastoral systems can employ simulation, GIS modeling, or other advanced analytic techniques.

[269] Lightning Rounds · ENDURING CULTURE HISTORY: CONSTRUCTIONS OF PAST COMMUNITIES AND IDENTITIES IN THE TWENTY-FIRST CENTURY

Archaeological cultures and horizon styles are fundamental organizational units in archaeology; however, in many cases, regional culture-histories were established early on, with limited theoretical development. This panel involves a cross-cultural reappraisal of what constitutes archaeological cultures, how we define them, and what they mean. The aims are twofold: to critically evaluate how we define and apply archaeological cultures and horizons as tools and concepts, and to explore individual patterns of adoptions, adaptations, and resistances in different material classes within units. The lightning-round format will allow participants to provide examples of material culture used to define specific archaeological cultures and offer insights into the efficacy of these cultures or styles as archaeological frameworks for comparing regional sites and interpreting past human behaviors. The open discussion will consider the benefits and disadvantages of using these frameworks as they exist in the examples presented here and elsewhere. We seek to understand various circumstances and relationships that are possibly represented by shared sets of material culture, style, and technology across landscapes, and to what extent our present archaeological cultures and horizons represent political, economic, and social units and reflect emic constructions of past identity and community.

[270] Symposium · FORMATIVE INFLUENCES: A GATHERING IN HONOR OF J. SCOTT RAYMOND

Over a lifetime of work in South America, Scott Raymond has greatly contributed to the archaeology of the neotropics. Beginning with his dissertation on the archaeology of the Upper Amazon of Peru, under the supervision of Donald Lathrap at the University of Illinois, Champaign-Urbana, Scott later moved his focus to the Valdivia culture of Early Formative period Ecuador. During the span of his productive career, his interests have included ceramic classification methodologies, the nature of subsistence systems, settlement patterns, and the social formations of Early Formative Ecuador. Friends, colleagues, and students of Scott will present on some of the ideas, research areas, and influences he has had on our discipline.

[271] Symposium · RECENT DEVELOPMENTS IN EAST AND SOUTHEAST ASIAN ARCHAEOLOGY I: MATERIAL CULTURE STUDIES

The archaeology of East and Southeast Asia continues to grow with new scholars, projects, and methodological developments. The dialogue across borders keeps expanding as well, albeit modestly. As in previous years, we wish to bring together scholars to encourage cross-cultural, cross-border, and cross-disciplinary discussions regarding two world regions that have a long history of interaction. As always, the number of participants exceeds by far the number of slots available in one session, so there will be two symposia on recent developments in East and South Asian Archaeology focusing on different aspects of research. This first part brings together papers on material culture studies covering both a wide geographic area and range of time periods. These papers

explore recent research on metal technology, ceramic production, and beads, but also issues of looting and other questions of field research.

[272] Symposium · NEW PERSPECTIVES ON THE ARCHAEOLOGY OF SOCIAL MEMORY IN THE CENTRAL ANDES

For over a decade, social memory has been a mainstay of archaeological inquiry. Scholars have sought to trace the archaeological remains of history, ancestors, monuments, landscapes, and other cultural media reflected in constructions of memory by past societies. Syntheses of archaeologies of memory have been produced for many regions in the world; however, the Central Andes have eluded such an in-depth study. This session seeks to bring together diverse scholarship in order to gain comparative perspectives on both the overall history of memory in the region, as well as the diversity of theoretical and methodological approaches utilized in the study of ancient Andean memory. Related theories that have evolved out of social memory approaches such as persistent place, resilience, and landscape emplacement will also be explored in this session. Topics covered will include the memory of the dead/ancestors, materiality of place, place-making, and ritual landscapes. The purpose of this session is for researchers of this topic to come together in order to survey and synthesize the differing themes on memory and persistence throughout the Central Andes.

[273] Symposium · CONTEMPORARY ISSUES IN ROCK ART CONSERVATION AND PRESERVATION

(SPONSORED BY SAA ROCK ART INTEREST GROUP AND ARARA CONSERVATION COMMITTEE)

Conservation and preservation of rock art is a goal of most rock art focused organizations as well as most government agencies tasked with protecting archaeological sites on lands they manage. The way these goals are accomplished varies throughout the world. Sharing information regarding steps taken to reach these goals, successes or failures of the steps involved, and lessons learned in the process can only lead to improved understanding of conservation activities and preservation results. Although conservation projects are often community initiatives spearheaded by an organized group or a government agency, individuals can also be the driving force behind site protection, and this session provides a forum to showcase projects of any size, at any location, using a variety of methods, and resulting in any level of success. The symposium seeks to provide an overview of contemporary actions being employed on behalf of rock art site protection.

[274] Symposium · ANTHROPIC ACTIVITY MARKERS: ARCHAEOLOGY AND ETHNOARCHAEOLOGY

People tend to recurrently use specific areas of their living space, producing an accumulation of evidence (chemical and/or physical) that represents the result of the activity performed. The possibility to identify and connect this evidence to the activity that generated the record is pivotal to our understanding of past human behavior. Ethnoarchaeology and experimental archaeology drive the inferential reasoning that creates the models connecting the distribution/concentration of proxies with specific activities. We define these models as "anthropic activity markers" and propose a transdisciplinary approach to reduce problems of equifinality whereby the same pattern might be caused by several activities. In particular, the analysis of the spatial distribution of the fingerprints under study is considered fundamental for the definition of anthropic activity markers. We aim to gather contributions from scholars in different fields willing to challenge this issue from different points of view and at different scales (landscape and domestic or productive structures), going from a macro- to a microscale, from "space" to "place." We invite contributions that include different approaches, such as remote sensing, archaeological prospection, botanic analyses, chemical analyses, archaeozoology, microdebitage, and micromorphology. Archaeological and ethnoarchaeological contexts will be welcome to show the potentiality of the approach.

[275] Symposium · OF DUNG AND HUMANS: THE ARCHAEOLOGY OF LIVESTOCK DUNG

Dung is a key interdisciplinary area of research as it provides valuable information on a wide range of environmental and ecological issues and socioeconomic and cultural aspects of human life. Livestock dung is commonly found in many settlements, especially after the domestication of herd animals. However, dung materials are regularly overlooked or missed using conventional excavation procedures, despite their worldwide economic importance as suppliers of fertilizer, fuel, and building material. This session showcases interdisciplinary approaches to debates surrounding the identification and interpretation of dung remains in archaeological contexts through multi-proxy analytical techniques in bioarchaeology, geoarchaeology and biochemistry. Additionally, the use of ethnography and experimental archaeology provide robust comparative data and models on factors affecting its composition, preservation, and taphonomy, as well as the environmental, management, and cultural practices influencing these. By bringing together participants working in a variety of geographic and temporal foci and from different fields of research, this session will review the state-of-the-art identification methods and approaches to further our understanding of archaeological livestock dung, and to identify avenues for potential future growth/developments in this key research area.

[276] Symposium · CURATING THE PAST: THE PRACTICE AND ETHICS OF SKELETAL CONSERVATION

The human skeletal remains curated within archaeological and museum collections belong to those who created the cultures that we seek to understand as archaeologists. Human and faunal remains recovered from archaeological excavations provide a wealth of information about past cultures, but also require the greatest care. The recovery, cleaning, and curation of bone often present one of the great challenges for archaeological projects as a bioarchaeologist or zooarchaeologist may not be on site. What is the best way to transport fragile materials to labs or to export them? How should they be stored until they can be analyzed, or over the long term? Should they be cleaned? Field labs, museums, and universities in remote locations are often only periodically monitored, can have extreme humidity or heat, be infested by insects or animals, lack financial support for collection maintenance, and/or be at risk due to natural disasters like earthquakes or hurricanes. This session describes techniques that osteologists have employed to address these problems as they have worked to curate and house skeletal collections from prehistory through the contemporary era in Europe, Asia, and the Americas in light of ethical and cultural considerations of modern populations.

[277] Symposium · SETTLEMENT SCALING IN ARCHAEOLOGY—NOT JUST MODERN, NOT JUST URBAN

The fact that cities become more efficient, innovative, and productive as they grow in population has been known for decades, but until very recently it was assumed that these properties were unique to modern capitalist economies. Three developments have cast significant doubt on this view. First, urban economists and economic geographers have had to make increasing use of insights from history and anthropology to account for features of contemporary cities. Second, a mathematical theory that predicts contemporary patterns has been developed, but it relies on very general properties of human networks embedded in space, not the specific properties of capitalism. Third, archaeological studies have discovered that many scaling properties of modern cities are also apparent in premodern and even nonurban settlement systems. These developments point toward a new way of framing human societies as complex networks, new avenues for the study of social evolution, and a new conception of the archaeological record as a repository of experiments in social and economic development. In this session we introduce settlement scaling theory to archaeologists, present a series of case studies from around the world, and critically assess its current strengths and weaknesses.

[278] Symposium · HOUSEHOLDS AND SOCIAL EVOLUTION: COMPREHENSIVE APPROACHES TO SOCIAL TRANSFORMATION

Social evolutionary transformation involves and affects all levels of human society, including households. Household and social evolutionary archaeological approaches, however, are often considered to have different goals and perspectives. Social evolutionary studies use a long-term and comparative approach to study how fluctuations and changes (both abrupt and gradual) in social, political, economic, and ideological systems can ultimately lead to the transformation and emergence of unprecedented sociopolitical organization. Household studies examine daily life as the locus of many important social, economic, political and ritual activities to understand some of the same systemic reorganizations and transformations. This session explores the relationship between social evolution and household archaeology in a global context. Bringing these two bodies of theory together involves taking a comprehensive approach to the study of societies and their internal systems and processes. This includes challenging commonly drawn divisions between the macro- and microscale, public and domestic domains, and ceremonial and quotidian activities. A more inclusive approach to the study of sociopolitical change can facilitate the effective use of temporal and spatial comparisons to better understand local regional developments and the dynamics of social complexity.

[279] Symposium · NEW DISCOVERIES AND MULTIDISCIPLINARY RESEARCH AT YANGGUANZHAI, CHINA

Yangguzhai is the largest known middle Neolithic site in the Wei River Valley of China. Over ten years of excavation and research at the site have yielded data on pottery production, house structures, diet, burial practices, and the construction of an ancient moat. In this session, current and former project participants will present research project in ceramic analysis, geoarchaeology, bioarchaeology, paleoethnobotany, and other fields. This ongoing multidisciplinary research has generated significant new information and a greater understanding of craft production, settlement structure, and domestic life in prehistoric central China.

[280] Symposium · RECENT SHIFTS IN MAYA ARCHAEOLOGY: INVESTIGATIONS OF THE COLONIAL AND NATIONAL PERIODS OF THE YUCATÁN

This session seeks to highlight developments in the archaeology of the colonial and early national periods throughout the Maya regions. Maya archaeologists working in Mexico and across Central America have produced a rich body of scholarship exploring Maya society before Spanish invasion and settlement. Maya archaeology has been influential at both the regional and the international levels, generating standards for archaeological practice, introducing innovative scientific techniques, melding archaeology with ethnohistory and epigraphy, creating theories about the rise, maintenance, and collapse of state-level societies. However, the rich material record and cultural groups from the periods following Spanish-Maya contact have remained marginalized within the archaeology of this important cultural and geographic region. This session will bring together scholars working through the region at sites from the colonial through early national periods, and beyond. Historical archaeology across Mexico and Central America is only just gaining momentum. The scholars involved in this session are contributing not only to the expansion of knowledge about these marginalized time periods in Maya archaeology, but are also addressing some of the field's most pressing theoretical and methodological questions.

[281] Symposium · FLOODED ANCIENT MAYA SALT WORKS, PAYNES CREEK NATIONAL PARK, BELIZE

The session discusses research at the Paynes Creek Salt Works, as well as comparisons with other ancient Maya salt works. Excavations and sediment coring carried out between 2009 and 2015 investigated the nature of the Classic period (A.D. 300–900) salt industry that used wooden buildings preserved below the sea floor in a shallow, salt-water coastal lagoon. Salt was produced by evaporating brine in pots over fires as indicated by briquetage, the remains of pottery vessels and supports used in the salt production. Ten underwater salt works were selected for transect excavations. Land sites with earthen mounds were excavated to evaluate their role in the salt industry. Sediment coring, as well as collection of marine sediment from underwater excavations focused on the timing and rate of sea-level rise. Remote sensing using an automated research vessel, as well as air photography from a drone augmented the systematic flotation survey on Research Flotation Devices (RFDs). The Paynes Creek Salt Works, with evidence of infrastructure of production and distribution, provide a model for other salt works along the coast that lack preserved wood, as well as expanding the types of salt production known from inland and coastal salt works.

[282] General Session · EUROPEAN ARCHAEOLOGY: FROM THE PALEOLITHIC TO THE RECENT PAST**[283] Symposium · NEW INSIGHTS INTO MISSISSIPPIAN CULTURE AT CAHOKIA MOUNDS STATE HISTORIC SITE**

Past and ongoing research at Cahokia, its satellites and outliers, has produced a plethora of information, old and new, which contributes to a better understanding of how this site was planned, organized, occupied, and evolved over several centuries. Current research also demonstrates how Cahokia related to and interacted with neighboring and distant sites, and how it reflected the cosmology of the Mississippian cultural tradition. This symposium will summarize the findings of current research in the greater Cahokia area, including the expansion of previous excavations, evidence copper technology, the relationship of Cahokia to its

outlying communities, new insights on community planning from geophysical tests, the astronomy and geometry of the site, and the internal reorganization and development of Cahokia proper.

[284] Symposium · METHODOLOGICAL ADVANCES IN ISOTOPIC ZOOARCHAEOLOGY

This session will explore new methodological advances in isotopic analysis using ancient animal remains to address key questions in human prehistory. Isotopic investigations in zooarchaeology have the potential to address diverse social and biological topics, including diet and foodway practices, hunting and procurement strategies, status and differential provisioning, exchange patterns, animal rearing and husbandry, biological consequences of domestication, and short- and long-term environmental changes. Examining these topics in past archaeological contexts is essential for understanding animal and human interactions in the present. Development of new methodologies in concert with traditional zooarchaeological analyses allow us to examine questions and issues regarding human ecology and environmental archaeology that were previously inaccessible.

[285] Symposium · ARCHAEOLOGIES OF EMPIRE AND ENVIRONMENT

(SPONSORED BY ARCHAEOLOGY DIVISION, AMERICAN ANTHROPOLOGICAL ASSOCIATION)

This symposium brings together archaeologists studying environment and empire across time and space to discuss the role that agriculture and land use plays in imperial strategies. This session asks how plants, animals, and other environmental resources become entangled in imperial acts of conquest and colonization, exploitation, and inculcation. This archaeological approach invites theoretical and methodological perspectives that connect imperial strategies with their environmental settings and imbue the environment with political criticality. They include environmental archaeologies that investigate local/regional signatures of empire; historical ecologies that ask how land management affects imperial biographies; political ecologies that presume environmental regimes have political valence; and new materialisms that infuse the nonhuman world with agency. When archaeologists view imperial land use and environmental management as forms of statecraft, the political landscape moves from metaphor to unit of analysis, and ecofacts gain empirical heft as artifacts of empire. This perspective reinstates an appreciation for the political economies of agrarian states, with all the resource flows and divisions of labor that surplus cultivation entails. At the same time, this approach treats political economies as human-environment interactions, which opens up all kinds of new questions, challenges, and approaches to the intersections of empire and environment.

[286] Symposium · ARCHAEOLOGICAL PERSPECTIVES ON THE EVOLUTION OF FORAGER COOPERATION

Habitual cooperation among non-kin is biologically unusual and yet a defining behavior of the human species. Understanding how such altruistic behavior emerges and persists among human populations remains an active and heavily debated area of anthropological and ecological research. While ethnographic forager studies have played a particularly prominent role in the discourse, contributions from prehistoric forager studies remain sparse due to the inherent challenges of studying past populations who left few, taphonomically vulnerable material traces. Nonetheless, because prehistoric foragers were the very individuals who catalyzed and maintained human cooperation for thousands of millennia, the insights to be gained may be particularly salient in advancing evolutionary theories of cooperation. This symposium seeks to identify the diverse ways that archaeological forager research can contribute to the study of human cooperation and to inspire new analytical directions at the intersections of theory, method, and data.

[287] General Session · ADVANCES IN ARCHAEOLOGICAL METHOD AND THEORY

[288] Symposium · BUTTERFLIES TAKE WING: RITUAL AND SYMBOLISM IN PRECOLUMBIAN MESOAMERICA

Butterfly imagery has been present for thousands of years in Mesoamerica whether painted, modeled, or sculpted. Its life cycle, bright colors, and soaring flight captivated the mind of culturally diverse peoples in the Americas for its significance as a symbol of renewal, transformation, fire, war, and death. This session draws on a diverse range of methodological enquiries based on recent iconographic and archaeological research about butterfly representation in Mesoamerica: ceramics from West Mexico, Toltec sculptures, Zapotec effigy vessels, Teotihuacan ceramics and mural paintings, and Postclassic books (codices) and gold. The methodologically and thematically diverse papers aim to grasp the multifaceted nature of the butterfly, an insect that incorporated the ideology of this rich cultural area. Through the lens of several Mesoamerican specialists, this session will throw new light onto its context-related associations, identify processes of information transmittal and emulation, and thus elucidate its implications in each cultural milieu.

[289] Symposium · INTER- AND MULTIDISCIPLINARY APPROACHES TO ARCHAEOLOGICAL RESEARCH IN THE CARIBBEAN

The main objective of this symposium is to bring together researchers who study topics related to Caribbean archaeology from inter- and multidisciplinary approaches. These approaches not only allow the incorporation of a wide variety of sources of information and/or methodologies but also foster the revision of previous interpretations. Some of the questions that need to be posed are: To what extent are auxiliary disciplines helping to expand the construction of the stories being created by archaeologists? How can we use archaeological data in a way that the general public can relate to the research being carried out? Through case studies that employ methodologies that borrow from documentary archaeology, collections management, and hard science, this symposium will explore the possibilities of broadening the interpretations of our understanding of past human activities within the Caribbean region. Likewise, it makes it possible to revisit existing collections and expand traditional research questions. In this symposium, we want to bring forward the efforts being made to creatively use existing sources and methods in the development of new research projects in the Caribbean.

[290] General Session · UNDERSTANDING PALEODIETS THROUGH ISOTOPIC RESEARCH I

[291] Lightning Rounds · “SO DO YOU, LIKE, WEAR A HAT LIKE INDY?” “COOL, I LOVE DINOSAURS!” “MY GRANDPA HAS THIS REALLY AWESOME POT IN THE ATTIC.” “CAN YOU SHUT DOWN THE PIPELINE?”—EFFECTIVE COMMUNICATION ABOUT ARCHAEOLOGY IN THREE MINUTES OR LESS

(SPONSORED BY PUBLIC EDUCATION COMMITTEE AND PUBLIC ARCHAEOLOGY INTEREST GROUP)

One of the many ethical responsibilities of an archaeologist is to demonstrate the relevance of archaeology and historic preservation to a diverse public in a meaningful way. Communication by archaeologists to the public is crucial to gaining support for archaeological resources, programs, and institutions. This is especially critical given recent trends at state and federal levels toward funding reductions and legislation that impacts archaeological resources. Additionally, skills in communication and outreach are increasingly valued in the archaeology job market. Anyone dealing with funding from public sources should be able to effectively communicate the value and relevance of archaeology to non-archaeologists. In today's world, this often involves communicating information quickly, simply, and sometimes with little preparation. This lightning round is an opportunity for archaeologists to present, in three minutes or less, an “elevator pitch” focused on public benefits of archaeology, how archaeology addresses contemporary problems, what is archaeology, or responding to an enthusiastic collector. Presenters will get immediate feedback from a panel of archaeologists with expertise in public engagement. Participants are allowed one PowerPoint slide to accompany their presentation. A group discussion will follow the individual presentations, and the panelists will provide further information and resources for communicating with the public.

[292] General Session · COLONIAL-ERA ARCHAEOLOGY IN CENTRAL AND SOUTH AMERICA

[293] General Session · CURRENT RESEARCH IN MESOAMERICAN ARCHAEOLOGY III

[294] General Session · MORTUARY PRACTICES AND FUNERARY ARCHAEOLOGY II

[295] Forum · CARING FOR HOMELANDS, PART 2: TRIBAL HISTORIC PRESERVATION IN THE UNITED STATES

(SPONSORED BY INDIGENOUS POPULATIONS INTEREST GROUP, COMMITTEE ON NATIVE AMERICAN RELATIONS)

Tribal Historic Preservation Offices are charged with the responsibility of preserving, maintaining, and revitalizing tribal cultural resources for future generations. In addition to these programs numerous other federal, state, and non-recognized tribal communities operate similarly oriented cultural resources departments. This forum brings together Tribal Historic Preservation and Cultural Resource Managers from across the United States to discuss the current state and future trajectory of tribal resource management. This forum is part of an ongoing attempt to highlight the unique issues that tribal communities encounter when attempting to care for cultural resources that extend well beyond the tangible remains associated with the archaeological record. Panelists will address how their offices and communities define tribal historic preservation, discuss how they developed their plan for managing tribal cultural resources, and share the strategies they use on the ground to implement these plans. Of particular focus is examining how each program balances the requirements of state and federal heritage preservation regulations with the specific needs and cultural values of the communities whose interests they protect.

[296] Symposium · EXPLORING MOVEMENT ON WATER: A GLOBAL COMPARISON OF NAVAL TECHNOLOGY AND NAVIGATION TECHNIQUES

Exploring the links between the expertise that has allowed people to move across water bodies—the sea, rivers, and lakes—and the lives of seafarers has taken a digital turn over the past several years. Increasingly, archaeologists are looking for ways to digitally re-create vessels using 3D visualizations and discuss navigation by reconstructing past environments or through least-cost pathway analyses and agent-based modeling. In many ways, these analyses bridge the gap between island and mainland communities but also among technologies, individuals, and the broader world. This session crosses the geographic divide between sailing and canoeing communities by inviting researchers who study water travel from various regions to share their interpretations of these different tool kits. Focusing on the specifics of studying aquatic mobility facilitates a clear discussion on what techniques were central to these modes of movement in the past and how these techniques influenced colonization efforts but also the construction and maintenance of social networks. Computer-based models can explore answers to these questions that are otherwise unapproachable due to poor preservation and the fluid nature of these environments. Papers in this session will consider navigation, investigate seafaring technology, or use computer methods to understand water-based travel.

[297] General Session · WESTERN ASIAN ARCHAEOLOGY I

[298] General Session · POLITICS AND INTER-POLITY DYNAMICS IN THE MAYA WORLD II

[299] General Session · ARCHAEOLOGY IN THE AMERICAN MIDWEST II

[300] Poster Session · NORTH AMERICA: CALIFORNIA

[301] Poster Session · ARCHAEOLOGICAL PERSPECTIVES ON THE SOUTHWESTERN LANDSCAPE

[302] Poster Session · OCEANIA

[303] Poster Session · A FLURRY OF FIELD SCHOOLS IN THE UPPER GILA AND MIMBRES DRAINAGES

The Upper Gila, San Francisco, and Upper Mimbres drainages have seen several cycles of intense research and student training since the 1930s. Field projects directed by notable archaeologists and institutions, including Emil Haury, Paul Martin and John Rinaldo, James Fitting, Harry Shafer, and the Mimbres Foundation, have periodically focused professional attention on the area while providing fertile training grounds for students in U.S. Southwest archaeology. Currently the area is in the midst of another archaeological boom, with field schools from multiple institutions introducing new students to the area and changing our understanding of the region through new research programs that span much of the precontact period. This session presents research from five current field schools, bringing together established and emerging scholars to present new insights on the archaeology of southwestern New Mexico and southeastern Arizona.

[304] Poster Session · ARCHAEOLOGY ALONG THE PAINTED DESERT: CURRENT RESEARCH IN PETRIFIED FOREST NATIONAL PARK

While Petrified Forest National Park has been the subject of archaeological research for over 100 years, intensive field research in the last five years has greatly expanded what we know about the prehistoric and historic occupation of the area. In 2004 Congress authorized a boundary expansion, effectively doubling the size of Petrified Forest National Park. These lands are slowly being purchased and added to the park. Initial cultural resource inventory projects are being conducted to begin to better understand what is out there. The results of survey in the boundary expansion have found a stunning density and diversity of archaeological remains. Archaeological sites spanning the last 13,000 years of human occupation have been identified, including most notably extensive preceramic sites and lithic landscapes, large Basketmaker villages, and a densely settled Puebloan landscape. This work has been coupled with an additional season of survey work in the park's pre-2004 core to contextualize previous research with these new areas. Also, over the last five years the NPS has taken this opportunity to use the park as a teaching laboratory, bringing in graduate student research and an extensive internship program. This session presents an update of the recent archaeology in Petrified Forest.

[305] Symposium · ECOLOGICAL PERSPECTIVES ON HOMININ LANDSCAPE USE DURING THE EARLY STONE AGE OF AFRICA

It is increasingly clear that Africa's Early Stone Age (ESA) sites sample a diversity of behaviors and no one model is sufficient to explain every collection of archaeological debris. Behavioral flexibility was thus probably a key component of hominin adaptations, and the goal of this symposium is to identify the ecological parameters, or affordances (resources and hazards), that conditioned where, when, and how hominins chose to concentrate their archaeologically visible behaviors across Africa's ESA landscapes. Papers in this session have a strong ecological focus and will contribute to an integrated examination of ESA hominin landscape use in Africa from faunal, lithic, paleobotanical, isotopic, and/or geological perspectives.

[306] Symposium · PAINTING AND CARVING THE UNDERWORLD: THE ARCHAEOLOGY OF GUERRERO THROUGH ITS CAVES

Previous survey by Gutierrez in the area had revealed numerous sites, but the past field season (summer 2016) of the PIPOG (Proyecto Interdisciplinario de la Prehistoria del Oriente de Guerrero) was the first reconnaissance focused on caves and rockshelters in the municipalities of Tlapa and Copanatoyac. In eastern Guerrero, cave sites have been used by humans since Paleoindian times to the present-day rain-petition rituals centered on the feast of San Marcos. This session reviews the preliminary findings of the PIPOG in a series of caves, including photogrammetric studies, pXRF elemental analysis of murals, and excavation.

[307] General Session · ADVANCES IN GEOARCHAEOLOGICAL RESEARCH METHODS I**[308] General Session · PERUVIAN ARCHAEOLOGY****[309] Symposium · REGIONAL CONNECTIONS IN NORTHERN ETHIOPIA AND ERITREA: RELATIONSHIPS BETWEEN THE EASTERN, WESTERN, AND CENTRAL HIGHLANDS**

(SPONSORED BY SOCIETY OF AFRICANIST ARCHAEOLOGISTS)

Traditionally, archaeological research in the northern Horn of Africa has had a strong focus on external relationships. Connections with the Mediterranean, Sudan, and especially the Arabian Peninsula have been emphasized. On the other hand, little research has been done comparing different sites within northern Ethiopia and Eritrea. This is mainly due to the limited number of excavated and fully published sites in the northern Horn. Recently, there has been a surge of excavation, research, and publication, making it more possible than ever before to compare different sites and regions within the highlands. The German Archaeological Institute project at Meqaber Ga'ewa and Ziban Adi represents the new southern extent of excavation, while the University of California–Los Angeles project at Mai Adrasha represents the new western extent. The goal of this session is to foster cooperation and exchange between current excavation teams and discuss how our various sites may have related to each other in the past.

[310] Symposium · THE PRECOLUMBIAN ANTIQUITIES MARKET: REFLECTIONS, CRITIQUES, AND EFFECTING CHANGE

Precolumbian antiquities are among the most popular items on the international antiquities market. Because of the opaque nature of the antiquities market and the phenomenal growth of online and alternative sales platforms in recent years, it has become increasingly difficult for the scholarly community to monitor the precolumbian antiquities market. Studies into this market are limited, repetitive, or outdated; we may not have a real sense of the nature and function of the current market for precolumbian objects. Without this information it is unlikely that we will be able to positively influence policy in this area or effect substantive change. This session will explore past, current, and future policies and trends concerning the sale of antiquities from Central and South America. By exposing the developments through time, and reviewing some of the most prominent individuals and organizations that have

bought and sold at auction, a clearer understanding of the current state of research into the market for precolumbian objects can be achieved. Having outlined gaps in our knowledge, this session seeks to identify the substantive steps that the academic community can take toward effecting transparency, accountability, and ethical practice within the precolumbian antiquities market.

[311] PAST PRESIDENT SESSION · A CELEBRATION OF THE LIFE AND WORK OF DR. DENA FERRAN DINCAUZE (1934–2016)

Participants in this forum will highlight the many achievements and contributions of Dena Dincauze. A distinguished scholar who specialized in the archaeology of northeastern North America, the peopling of North America, and environmental archaeology, Dr. Dincauze's many achievements include having earned a PhD from Harvard University in 1967, a time when few women were completing graduate studies in archaeology. She was a research fellow at Harvard University, an assistant professor at SUNY Buffalo, and an assistant, associate, and full professor at UMass Amherst, where she retired as a professor emerita in 2001. Over the course of her career she significantly influenced the field through her scholarship, publications, conference papers, editorial board service, teaching, and mentoring. Over the course of her prominent career she served as the president of the SAA, editor of *American Antiquity*, president of the Society for Professional Archaeologists, and was the recipient of the SAA Distinguished Service Award in 1997. She was a dedicated mentor to several generations of archaeology students, many of whom have gone on to make their own substantial contributions to the discipline. She was an especially strong mentor for women in archaeology and, as such, has left an indelible impact on the field.

[312] Forum · CURRENT CHALLENGES IN USING 3D DATA IN ARCHAEOLOGY

3D technologies are integral to current practice in archaeology, and part of the daily work of a growing community of archaeologists in research and heritage management. Reality-based models, produced through techniques like laser scanning and photogrammetry, and virtual reconstruction models play important roles in many applications, impacting data collection, analysis, and presentation. As technical barriers are overcome, significant intellectual challenges remain for the full integration of 3D content in the field. This forum discusses three key challenges: (1) integrating 3D into scholarly publications, (2) scaling up data collection and maintaining appropriate accuracy, and (3) 3D work as a reflexive research process.

[313] Forum · ANIMAL ARCHAEOLOGY

Animal archaeology is an emerging discipline that uses the techniques and methods of archaeological science to study the past behaviors of nonhuman animals. Its applications to animal behavior are multiple. They include tracing the history of a species' tool use, identifying a species' past ranges that are no longer in use, and understanding how animals interact with objects in their daily lives. For archaeologists, it can help us to understand the evolution of the human species, distinguish human from nonhuman subsistence remains, and provide another outlet for archaeological skills. This forum brings together a diverse selection of animal archaeologists who are pushing the boundaries of two disciplines. We will openly discuss ways forward through the clashing of disciplines that is animal archaeology. Each participant will briefly present their work, and there will be ample time for discussion among the participants and audience.

[314] Lightning Rounds · BREAKING NEWS! LIGHTNING STRIKES CROWD OF ARCHAEOLOGISTS AT SAA ANNUAL MEETING: STUNNED SPECTATORS WALK AWAY WITH AMAZING STORIES OF ETHNOARCHAEOLOGY, EXPERIMENTAL, AND CULTURAL STUDIES RESEARCH

Lightning talks are meant to quickly orient an audience and inspire lively and meaningful discussion. Our lightning event focuses on current ethnoarchaeology, experimental, and culture studies research. Presenters will enliven this session with research tales from Africa and the Americas. The audience will learn of the material and social culture of Indigenous groups such as the Miami Tribe of Oklahoma, a local Greenlander community, and Western Namibian pastoralists, along with ethnoarchaeological investigations of Victorian English churchyard gravestones and prehistoric shell industries and cooking techniques in the eastern and midwest United States. Participants will be riveted by experiments on the making of sinew thread, cooking Alaskan king salmon, and beer production, and challenged to consider issues such as climate change and how can we use what we learn about the past and present to provide real, applicable solutions.

[315] Lightning Rounds · BREAKING GROUND WITHOUT A SHOVEL: COLLECTIONS-BASED RESEARCH IN THE FIELD OF ARCHAEOLOGY

(SPONSORED BY THE COMMITTEE ON MUSEUMS, COLLECTIONS, AND CURATION AND THE STUDENT AFFAIRS COMMITTEE)

Until recently, the value of collections-based research (CBR) within the field of archaeology has been underestimated. There is a perception that to do collections-based research is somehow less: less exciting, less rigorous, less groundbreaking. This session is designed to demonstrate to students and professionals alike that CBR is not only a viable and less expensive alternative to fieldwork, it is also a responsible way to ensure that collections are maximized as an existing resource. Archaeological collections have a long life span and limitless potential. Much of the time, collections are curated in a facility, ready to be rediscovered and used for dissertations, theses, and other research investigations. For students especially, it is critical to understand that CBR provides the tools for comparative research, to make new assertions about old sites, especially those which can no longer be actively excavated. Discussants will cover a variety of topics, ranging from exciting new CBR discoveries to new avenues of inquiry with long-standing collections. Recent graduates, current students, and professionals will speak about their experiences with collections-based research, highlighting the challenges and achievements, as well as the etiquette of gaining access to these collections.

[316] Symposium · MULTIDISCIPLINARY RESEARCH AT CASTILLO DE HUARMEY, PERU

The site of Castillo de Huarney on the north coast of Peru is widely known for a spectacular 2012–2013 discovery—an intact tomb under the Wari imperial mausoleum where a large number of elite females along with their rich grave goods were buried. Along with

extensive excavations and surveys, the Polish-Peruvian archaeological project—Proyecto de Investigación Arqueológica Castillo de Huarmey (PIACH)—is engaged in multidisciplinary research on each aspect of the Wari presence on the north coast of Peru. This research includes analyses of the geographical, geological, and cultural contexts; architecture; artifacts and various techniques used for producing them; sources for textile, pottery, and metal production; as well as osteological, biogeochemical, and genetic analyses of the bioarchaeological individuals. As most of the work is still in progress, the session is designed to inform the scholarly world of this cutting-edge research and to generate a discussion on the results obtained to date.

[317] Symposium · COLONIAL CONSEQUENCES: RESULTS FROM THE ARCHAEOLOGICAL SURVEY OF COLONIAL DOMINICA

Brought into the foreground of anthropological concern through the works of Sidney Mintz, Eric Wolf, and others, the plantation is a spatial and economic category that is at once familiar and strange to archaeologies of environment, social complexity, and power. Through a concentrated examination of one landscape, Soufriere, a settlement enclave on the island of Dominica, and its evolution between the seventeenth and nineteenth centuries, this panel revisits and destabilizes the plantation as a socio-ecological form and explores the unique and dynamic configurations of identity, power, and social relations that such a space engenders. In its material and aspirational emergence, the plantation landscape left behind a material record that enables participants to interrogate three questions. What makes a plantation a plantation? How are social and economic inequalities built into its landscape? How does the material record of enslaved workers speak about, with, or against the plantation as a concept and socio-ecological form? This panel builds on archaeological studies that looking at the evolution of colonial society, demonstrated how domestic economies are essential to understanding the political economy of island colonies, and how ordinary people were linked through regional and interregional interactions in ways not expected by colonial elites.

[318] Symposium · MOBILIZING THE PAST: ARCHAEOLOGY AS ACTIVISM
(SPONSORED BY QUEER ARCHAEOLOGY INTEREST GROUP)

Through studies of the past, archaeologists implicitly or explicitly influence the present. The impacts of archaeological research on everyday life range from government policy and legislation, to the reinforcement or subversion of societal norms through naturalization narratives, to the formation of community through a sense of shared past. Recognizing these impacts among others, archaeologists have begun to explore archaeology not just as a means of reconstructing the human past but also as a tool for shaping the present. This empowers archaeologists to heal the wounds and ongoing violence inflicted by colonialism, legitimize the identities or narratives of marginalized people, better care for our environment, represent the needs of living communities, and improve the world around us. This session will explore how archaeologists can extend their focus beyond academia in order to positively impact living people through investigations of history and material culture. Presenters will build on frequently discussed topics in archaeology including community and indigenous archaeologies, demonstrating how we can further our approaches to help heal trauma and build community and bringing to light less commonly discussed issues such as homelessness, gentrification, and LGBTQ rights, thus showcasing the versatile potential of archaeological approaches to activism.

[319] Symposium · TOWARD A SOCIAL ARCHAEOLOGY OF FOOD IN NORTHERN NORTH AMERICA

Archaeology in northern North America has long focused on documenting and modeling hunter-gatherer subsistence strategies within a framework that views the procurement, processing, and consumption of food in terms of peoples' adaptations to the natural environment. While important, it is clear from the ethnographic record of the region that "food" embodied and offered more to hunter-gatherers than mere sustenance. This session offers case studies that highlight cultural dimensions of northern foods in antiquity. Papers address the social construction of edible and inedible foods; the preparation and presentation of food—cuisine; the transformation of plants, animals, and nonhuman persons into food; the role of food in the crafting of identity, the construction of gender, and status; food in trade, feasting, and ceremonial activities; and social and ideological aspects of the procurement, processing, consumption, and discard of food.

[320] Symposium · CHARTING THE EVOLUTION OF THE TRES ZAPOTES POLITY: RESULTS OF THE RRATZ 2014–2016 FIELD SEASONS

The Olmec and Epi-Olmec center of Tres Zapotes boasts a continuous occupation that spanned over two millennia. For over half that time, between 800 B.C. and A.D. 300, it ruled as the capital of one of the most resilient polities of the Mesoamerican Gulf lowlands, surviving and flourishing after the collapse of Olmec capitals to the east. Subsequently, the area supported a dynamic political landscape occupied by smaller competing polities. In 2014, with NSF support, we initiated a settlement study to place the rise, florescence, and decline of Tres Zapotes in its regional context, combining traditional pedestrian survey and surface collection with high-resolution lidar-assisted survey. This symposium presents results of the 2014–2016 fieldwork and ongoing laboratory analysis. Participants will present the theoretical foundations and methods of the survey, reflections on community engagement and the social context of regional survey, an overview of settlement patterns, and new information on interregional interaction, Classic period formal architectural layouts, variation in obsidian production and use, and an unexpectedly robust Postclassic occupation.

[321] General Session · MESOAMERICAN RITUAL STUDIES

[322] Symposium · LOCAL RESPONSES TO REGIONAL INTEGRATION IN POSTCLASSIC MESOAMERICA

An increase in militarism and exchange in Postclassic Mesoamerica brought along greater political, economic, and cultural integration of the region. Expansionist states warred, conquered, and brought into their sway smaller polities undergoing different processes as boundaries were redefined; buffer zones were created, expanded, and retracted; and alliances shifted in response to a changing geopolitical landscape. This session explores the different local and regional responses to the greater political and economic integration that took place throughout Mesoamerica in the Late Postclassic.

[323] Symposium · SPATIAL APPROACHES TO CRAFT PRODUCTION

Craft production has long been a topic of major interest in archaeology. The spatial arrangement of these activities reflects important features in the social organization of production. Yet interpreting the social meaning of these spatial patterns is challenging, and the relationship between a given spatial distribution and particular type of social organization is not always clear. Considerations of space and craft production are also beset by methodological difficulties. Some kinds of craft production leave ephemeral or difficult-to-identify residues in the archaeological record, posing challenges for identifying the specific places where production occurred. In cases where identification of production contexts detailed excavation or laboratory analysis, moving from single contexts to broad spatial patterns is not a straightforward process. The papers in this session will offer new methodological and interpretive perspectives on how archaeologists approach spatial patterns in craft production. The session aims to bring analyses of craft production at all spatial scales into conversation with one another.

[324] Symposium · POWER FROM BELOW: COLLECTIVITY AND HETERARCHY IN GLOBAL PERSPECTIVE

This symposium focuses on how ordinary people self-govern or co-govern, creating complex polities that maintain egalitarian structures, espouse egalitarian ideologies, or both. We focus on systems of governance engineered to balance power, but also how they continuously develop, falter, and are reshaped: some built directly on earlier egalitarian roots, others stemming from overthrow of authoritarian structures through a yearning for "return" to more balanced rulership—real or imagined. Archaeological concern with alternative forms of governance burgeoned after the "social turn" that took root in the 1980s, followed by convincing exploration of concepts like heterarchy and corporate organization in the 1990s and beyond. Today, the idea of differently organized distributions of power no longer needs to be justified, leaving room to expand study into collective action, subaltern political movements, self-organized production, public assembly places, and political cohesion based on principles other than kinship and coercion. Contributions delve more deeply into this multidimensional space, where complex politicized actors, from commoner to ruler, can be studied. These once-invisible people can be discovered through the use of new methods and theories, fundamentally changing our perception of how past societies were constituted.

[325] Symposium · LANDCOVER6K: USING ARCHAEOLOGY TO IMPROVE CLIMATE MODELS

LandCover6k is an international and interdisciplinary working group dedicated to reconstructing human land use across the Holocene. The goal of this initiative is to critically evaluate and improve models of anthropogenic land cover change used in climate science and historical modeling, work that is urgently needed. Current climate models make little use of the vast repository of evidence about human history, despite an awareness that humans are one agent of global change. Vegetation is known to change in response to many factors, including human land use, but the complex and variable relationships between land use and land cover are still insufficiently understood. Differing assumptions about these relationships have led to significant differences between models of anthropogenic land cover change, a shortcoming with immediate scientific and policy implications for work on global climate. Global climate models thus make use of quite problematic assessments about the subject matter of archaeology and history. In this session, we outline the goals and procedures of LandCover6k and report on preliminary work classifying, compiling, and mapping land-use data from several world regions. Archaeology turns out to be a critical discipline for understanding not only the past, but also the present and future.

[326] Symposium · NICA NEWS: RECENT ARCHAEOLOGICAL RESEARCH IN NICARAGUA

In 1881 John Bransford observed that "nowhere in the Americas was there greater potential for archaeological research than in Nicaragua." Over 100 years later, that potential is being realized through numerous national and international research projects. Perhaps due to the relative stability of the country, and especially because of the openness to collaborative research, Nicaragua has become a popular destination for archaeologists. This symposium brings together Nicaraguan and international scholars to present their recent research. Potential topics include excavation reports, analyses, and new interpretations.

[327] Symposium · CONNECTIVITY AND COMMUNITIES OF PRACTICE IN LOWLAND SOUTH AMERICA

(SPONSORED BY LEVERHULME TRUST [RPG-2013-234])

The concepts of "communities and constellations of practice" are employed in archaeology to engage with the connectivity between material culture, knowledge, agency, structuration, and identity. These frameworks emphasize the socially situated and culturally transmitted nature of how to do and make, and seek to trace their empirical outcomes at different spatio-temporal scales. Archaeologists in Amazonia and circum-Amazonia have long sought to explain the occurrence of large-scale and persistent phenomena, while simultaneously accounting for the cultural-linguistic-ethnic diversity apparent across the regions in which they occur. In this context, how can understanding shared notions of practical action aid the study of generative processes underlying the material record? We propose that a crucial connection between historically and contextually specific processes (e.g., innovation, emulation, syncretism) and long-term trajectories (tradition, orthodoxy) within and between communities may be forged by considering practices and their circumstances of transmission. Moreover, identifying vectors of transmission (social networks, geography) can help suggest how they modified, amplified, or constrained historical outcomes. This session aims to unite scholars in discussion under this broad theme, and as a lens through which to view both variation and homogeneity. Challenges to the definition of the community, whether real, imagined, or archaeological, are also welcome.

[328] Symposium · PROTECCIÓN DEL PATRIMONIO CULTURAL EN MÉXICO, A TRAVÉS DE LA DIRECCIÓN DE REGISTRO PÚBLICO DE MONUMENTOS Y ZONAS ARQUEOLÓGICAS E HISTÓRICOS

La Dirección de Registro Público de Monumentos y Zonas Arqueológicas e Históricas es una dependencia del INAH creada desde 1972, a partir de la necesidad de tener el conocimiento pleno de los bienes muebles e inmuebles del país como lo son: paleontológicos, arqueológicos e históricos, así como el conocimiento de su ubicación para su resguardo, ya sea por personas físicas, personas morales, y los que forman parte de los acervos del propio instituto. Con el objetivo de dar a conocer las tareas sustantivas de la Dirección de Registro Público y las normas bajo las cuales se protegen dichos bienes, se pretende exponer y difundir ante colegas nacionales y extranjeros las problemáticas, retos y logros en relación al patrimonio cultural mexicano y su

protección, además de hacerlos partícipes de la relevancia de su colaboración en la inscripción de los sitios y materiales, obtenidos como resultado sus investigaciones en México.

[329] Symposium · INTEGRATING AND DISINTEGRATING IN CENTRAL YUCATÁN: ARCHAEOLOGICAL APPROACHES TO SOCIAL CHANGE AT MULTIPLE SCALES

This session explores the dual processes of integration and disintegration primarily through research in the central Yucatán region of the Northern Maya Lowlands. From Formative through Colonial periods, central Yucatán was shaped by the convergence of distinct styles, variable household practices, intersite causeway systems, long-distance exchange, and cosmopolitan identities. We hope to show that integration and disintegration were not restricted to Classic period kings and elites, but date back to the emergence of monumental communities, through the historic period, affecting all levels of society. Archaeologists are often compelled to study integration, the processes and dynamics by which social entities (communities, cities, and states) came together to incorporate wider populations. Of equal importance, this session also focuses on disintegration, the processes by which those social entities, held together by kinship, tradition, and memory, splintered apart. This session investigates these dual processes across multiple scales of social entities, from individual actors and households to communities and regions. By studying both integration and disintegration as two ends of a continuum of social change, we gain a more dynamic perspective of what change meant for institutions, populations, and the daily practices and identities of people living in central Yucatán and beyond.

[330] Symposium · INVESTIGATING THE HUNTER-GATHERERS OF LAKE BAIKAL AND HOKKAIDO: INTEGRATING INDIVIDUAL LIFE HISTORIES AND HIGH-RESOLUTION CHRONOLOGIES

(SPONSORED BY BAIKAL-HOKKAIDO ARCHAEOLOGICAL PROJECT)

The Baikal-Hokkaido Archaeological Project has been undertaking research on some of the richest hunter-gatherer archaeological records in the world. A particular focus has been on a range of bioarchaeological analyses, including AMS 14C dating, stable carbon and nitrogen isotopes, strontium isotopes and ancient DNA, as well as human and faunal osteological analyses. This symposium presents new research emerging from the project, and assesses its importance for our understanding of past adaptations in the region, as well as the implications for hunter-gatherer research agendas worldwide. Aspects of continuity and discontinuity are emphasized, particularly in the light of the increasingly high-resolution chronological framework that is becoming available, allowing us to consider historical processes among the hunter-gatherers of Baikal and Hokkaido in ways that were previously not possible.

[331] Symposium · STATUS AND IDENTITY IN THE IMPERIAL ANDES

From the fifteenth to the seventeenth century, Andean populations lived a tumultuous period of cultural contact and entanglement, resulting in a variety of interactions and negotiations between Inka, Spanish, indigenous, and African peoples. While the study of indigenous agency during Imperial Inka and Spanish periods of contact has received an increase in deserved attention (deFrance 2003; Van Buren 1993; Wernke 2007, 2013), the role of status and power in shaping colonial interactions has received less consideration. Current archaeological research in the Andes has the potential to build on existing studies of domestic life and changing foodways to better understand complex power dynamics and social dimensions. By focusing on access and incorporation of both indigenous, African, and Spanish goods, as well as their determined quality and value, archaeological studies are well positioned to develop a more nuanced and intimate picture of colonial period social dynamics, especially in regard to the daily negotiations of status and identity. Building on household studies from Spanish Florida (Deagan 1996), this session examines how indigenous and African peoples selectively incorporated or rejected Imperial goods, and how differential opportunities of access to these goods may have influenced social status, health, and relationships with imperial actors.

[332] Symposium · OPEN AIR CAMPS OF THE TERMINAL PLEISTOCENE AND EARLY HOLOCENE: INTRA-CAMP SPATIAL ORGANIZATION, ACTIVITY AREAS, AND TECHNOLOGY

Open air camps from the terminal Pleistocene and early Holocene are rare and pose significant challenges in excavation, analyses, and interpretation. This international symposium brings together case studies of camp sites that provide a means to summarize and discuss current understandings of these important sites. This global discussion provides the opportunity to collaborate on challenges and interpretations. In this symposium we survey intrasite patterning of activity areas, including habitation structures, toward the goal of defining the diversity in site structure and activities.

[333] Symposium · RECENT DEVELOPMENTS IN EAST AND SOUTHEAST ASIAN ARCHAEOLOGY II: SITES, LANDSCAPE, AND ENVIRONMENT

The archaeology of East and Southeast Asia continues to grow with new scholars, projects, and methodological developments. Dialogue across borders keeps expanding as well, albeit modestly. As in previous years, we wish to bring together scholars to encourage cross-cultural, cross-border, and cross-disciplinary discussions regarding two world regions that have a long history of interaction. The number of participants exceeds by far the number of slots available in one session, so there will be two symposia on recent developments in East and South Asian Archaeology focusing on different aspects of research. This second part takes on the macro perspective by discussing human-environment and site-landscape interaction as well as long-distance exchange during prehistoric and early historic periods throughout East and South East Asia.

[334] Symposium · APPLYING INDIGENOUS FRAMEWORKS FOR ARCHAEOLOGICAL ANALYSIS AND INTERPRETATION

Archaeologists often apply interpretative frameworks that they derive from Western disciplinary contexts, even toward sites that were created and organized within non-Western or Indigenous cultural contexts. In this session, we offer contributions that concern Indigenous frameworks—whether as theory, linguistic concepts, oral histories, organizational principles, and/or cognitive or ontological categories—that can be applied toward the analysis and interpretation of archaeological sites. This requires gauging how to configure Indigenous concepts with archaeological strategies and testing methodologies. Such approaches also may involve considering ways to articulate Indigenous frameworks within existing or broadly framed theories, in order to translate from local

interpretations for greater import and applicability. Collaborative and community-oriented archaeologies have provided much groundwork for such approaches, yet some projects limit Indigenous collaboration toward its contemporary practice and contexts, and we seek to highlight avenues of analysis toward the archaeological record. Historically, archaeologists have often sought the theories of Western figures, whether the positivist scientists for processualists or the French poststructuralist theorists for postprocessualists. But, to evaluate the sites of Indigenous peoples, we will emphasize how the cultural ideas and traditions of Indigenous peoples can provide interpretive frameworks for analysis and interpretation to better understand archaeological histories.

[335] Symposium · WALLS, MOUNDS, AND POTS: EXAMINING THE CLASSIC PERIOD HOHOKAM

The Hohokam Classic Period is characterized as a time of change, social differentiation, and possible stratification. The ubiquitous use of towering compound wall, standardized platform mounds, and the widespread adoption of a new kind of pottery, Salado Polychrome, are some of the indicators that a new ideology had spread across the Hohokam region. Archaeological literature has shown that the Phoenix Basin, Tonto Basin, Tucson Basin, and other parts of the Hohokam world were a part of this shared ideology, but differed in how the ideology manifested. The goal of this session is to highlight recent work focused on the Classic Period. Paper topics in this session include ceremonialism and ideology, social and sociopolitical organization, social interaction, exchange, architecture and monumentality, and agriculture and subsistence. These papers, detailing aspects of the Classic Period in different parts of the Hohokam region, will provide a large-scale summary of current Classic Period research.

[336] General Session · MAPPING AND MODELING ARCHAEOLOGICAL DATA

[337] Symposium · THE DYNAMICS OF THE PRECLASSIC IN THE HEART OF THE MAYA LOWLANDS

Understanding the Preclassic period (900 BCE–150 CE), and in particular the Middle Preclassic (900–300 BCE), is essential for grasping the dynamics of Maya society. However, while our knowledge regarding the development of early communities in the tropical lowlands of the Maya region has advanced greatly in the past decade, important questions still remain. Since 2011, a multidisciplinary project at the site of Yaxnohcah, located in southern Campeche, has focused on the early processes that led to the emergence of massive, archaic city-states during the Late Preclassic (300 BCE–150 CE) and Classic (150 CE–850 CE) periods in the Central Karstic Uplands. How did early settlers adapt to the environment, which was dominated by seasonally inundated wetlands? How did inhabitants manage early infrastructure projects involving extensive landscape modification? What forces served to integrate dispersed communities? What processes led to the emergence of political centralization? What factors led to the development of a unique form of urbanism in the Maya area? The papers in this session address these and other questions, and situate Yaxnohcah in a network of Preclassic cities, including Calakmul, Nakbe, El Mirador, and Tintal, within the Central Karstic Uplands.

[338] Symposium · MANOT CAVE: IN SEARCH OF MODERN HUMANS

Manot Cave in Israel produced a 55,000-year-old anatomically modern human skull (Manot 1) and dense archaeological layers dated to the Early Upper Paleolithic period. Research on the human and the archaeological remains represent a major advancement in the understanding of the origin of our species and modern behavior in Western Asia. The aim of the proposed symposium is hence to present the public with the most updated interdisciplinary studies on Manot Cave to provide insights to the culture and environments of Early Upper Paleolithic modern humans in the Eastern Mediterranean region. Specialists working in excavation and analysis of the materials from the cave illustrate the results of their most recent work.

[339] Symposium · IMPLICATIONS OF THE PROMONTORY, DISMAL RIVER, AND FRANKTOWN ARCHAEOLOGICAL RECORDS FOR APACHEAN PREHISTORY

Earlier investigators—including Julian Steward, Waldo Wedel, Jim and Dee Gunnerson, and Mel Aikens—each voiced the suspicion that the Promontory Culture and the Dismal River Aspect reflected the presence of Proto-Apachean populations in the eastern Great Basin and Central Plains. The Gunnersons also saw notable similarities linking the two archaeological constructs. Although these suspicions saw relatively little subsequent attention, both archaeological records have received more intensive study in recent years. At the same time, linguistic, genetic, and anthropological studies have provided ever sharper focus for what we should expect for migrating ancestral Apachean populations in an era when opportunities for hunter-gatherers expanded. Papers in this session will explore search images developed from interdisciplinary perspectives for Proto-Apachean archaeological records, along with reports on renewed investigations of key sites, high-resolution chronologies, a focus on perishable artifacts (like moccasins) more apt to reflect cultural identity than lithic assemblages, a synthesis of the footwear “landscape” in late prehistoric period Great Basin and Plains records, insights into demography, a better understanding of subsistence activities and paleoenvironments through isotopic and zooarchaeological analyses, evidence of interaction with surrounding societies, and a clearer picture of ceramic assemblages derived from formal studies and sherd geochemistry.

[340] Symposium · WHERE THE WILD THINGS ARE NOT: HUMAN-ANIMAL INTERACTION IN THE SPACE BETWEEN WILD AND DOMESTIC

(SPONSORED BY ZOOARCHAEOLOGY INTEREST GROUP)

Western tradition has tended to view animals in a binary opposition of wild versus domestic, with limited appreciation for forms of cultural engagement with animals in the space between these poles and little recognition that these liminally placed relationships do not inevitably lead to animal domestication. Archaeologists no longer treat the wild-domestic transition as a threshold. Instead they have come to view domestication as a continuum or a range of possible pathways that may be followed. With this shift in perspective, growing attention has been devoted to the diversity of human-animal interactions that occur between the fully wild and fully domestic states, the cultural underpinnings of such relationships, and their zooarchaeological correlates. Significant questions in this area of scholarship are many. What social, political, and economic functions do non-wild, non-domestic animals fill? Under what conditions do such roles arise? What circumstances initiate a trajectory toward domestication, and, where this does not ultimately occur, why not? This symposium will explore these questions and related topics through examination of practices such as

taming, pet keeping, wild management, captive management, animal translocations, commensal relations, and other forms of human interaction with animals that are neither wholly domestic nor truly wild.

[341] Poster Session · NORTH AMERICA: MIDWEST I

[342] Poster Session · NORTH AMERICA: MIDWEST II

[343] Poster Session · NORTH AMERICA: PLATEAU

[344] Poster Session · NORTH AMERICA: PLAINS II

[345] Poster Session · NORTH AMERICA: PLAINS I

[346] Symposium · EROTETICS, GIS, AND DATA RESOLUTION: SPATIAL ANALYSIS IN ARCHAEOLOGICAL PRACTICE

Over the past two decades the use of geospatial analyses and GIS within archaeology has grown in popularity and analytical power. Crucial to this success have been advances in personal computing and the increased availability of geospatial data at varying resolutions. However, finer resolution data does not guarantee a superior result. The questions we ask often dictate our data needs and it is the responsibility of the researcher to carefully define the scale of analysis and units used. This symposium focuses on erotetics (the logic and theory of questions) and the role of data resolution, scale, and evidence in modern GIS-driven archaeological research. Drawing on case studies from Europe, Oceania, the Americas, and Africa, this symposium provides an opportunity for scholars to explore the pragmatic nature of geospatial research, and the diversity of methodological approaches currently available for answering geospatial questions of interest to archaeologists.

[347] Symposium · MUSIC ARCHAEOLOGY

The study of ancient music and sound-related activities is an interdisciplinary field that has become increasingly popular in recent years among scholars from around the world. A brief survey of music archaeological papers that have been presented at the SAA annual meetings during recent years, demonstrates the potential for research in this discipline. However, researchers are commonly spread across general sessions often reflecting the geography of their study area instead of the topic of their papers. In addition to presenting individual research, this symposium brings together scholars who are interested in archaeomusicology so that they can collaborate on new ideas, discuss issues with current research, and explore new avenues in the archaeological study of music/sound. Papers will encompass various aspects of ancient music that includes (but is not limited to) archaeologically recovered music instruments, music-related iconography, performance, and dance.

[348] Symposium · ARCHAEOLOGICAL PERSPECTIVES TOWARD MEDICINE AND GLOBAL HEALTH

With recent outbreaks of infectious diseases such as Ebola and Zika and rising rates of chronic disease such as asthma and obesity worldwide, there has been a growing awareness of the urgency to develop novel approaches to public health and the investigation of disease. As biomedical and genomic research generate new data, knowledge, and methods of treatment, many questions remain about the evolution, proliferation, and history of a number of conditions of global health concern. Archaeology, as both a methodological approach and an analytical framework, has a unique potential to contribute to these efforts. In particular, collaborations with the biological and ecological sciences can produce a finer-grained narrative of how specific diseases and health conditions proliferated in the past, and the ways in which humans have responded to these issues. When combined with social theory and history, these approaches offer a historical perspective that can inform preventative and treatment strategies for the future. This session aims to showcase archaeological research into issues related to global health and medicine to date, and to offer a creative space for archaeologists to shape discourse that will drive future investigations.

[349] Symposium · ARCHAEOMETRIC STUDIES IN THE MAYA AREA

In recent years a wide array of archaeometric studies has been used to approach questions regarding Maya cultural history. Research projects have been developed concerning both precolumbian and historical contexts. Quantitative techniques span interdisciplinary fields such as material sciences, geographical information systems, residue analyses, geoarchaeology, and environmental studies. Although methods might pertain to the so-called "hard sciences," research topics focus on cultural issues such as technological development, settlement patterns, use of narcotics, or anthropogenic impacts on the environment. Presentations are welcomed both in English and Spanish.

[350] General Session · REMOTE SENSING METHODS IN ARCHAEOLOGY II

[351] Symposium · THE U.S. ARMY CORPS OF ENGINEERS' REGULATORY PROGRAM AND HISTORIC PROPERTY MITIGATION

The U.S. Army Corps of Engineers' (Corps) Regulatory Program is one of the oldest regulatory agencies in the federal government. Its mission is to protect the nation's aquatic resources while allowing reasonable development through fair and balanced permit decisions under the authority of Section 10 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act of 1972, and Section 103 of the Marine Protection Research and Sanctuaries Act of 1972. Fulfilling its mission, the Regulatory Program must consider the potential effects of its permitting actions on historic properties in compliance with the National Historic Preservation Act

of 1966. When adverse effects to historic properties cannot be avoided, the Corps consults with the permit applicant and other consulting parties, in a collaborative effort, to develop appropriate mitigation measures. Increasingly, agencies, State Historic Preservation Officers, tribes, and the public are becoming dissatisfied with simple "document and destroy" mitigation. Stakeholders want relevant, nuanced, collaborative mitigation with tangible products that speak to their concerns. This session explores efforts by the Corps' Regulatory Program, including the consultation process with stakeholders, to develop innovative and meaningful mitigation.

[352] Symposium · FAIRS, FEASTING, AND RITUAL IN NORTHERN MEXICAN CONTEXTS

Gatherings for ceremonies, pilgrimages, and commemorations have always formed an integral part of the lives of folks that lived in the various landscapes of northern Mexico. In this session, we consider ritual settings in several different social and temporal contexts that span from prehispanic sites of different scales in the modern-day states of Durango and Zacatecas, civic and religious celebrations in colonial Nueva Vizcaya, celebrations in a nineteenth-century mining village, and the yearly journey to the beach by folks in northern Sonora. For each setting, we consider the relationships between material culture, the locales, and the activities that make these gatherings both special and an integral part of the processes involved in identity creation and regional integration combining ethnographic analogy, historical research, interviews, and ethnography with traditional archaeological method.

[353] General Session · CURRENT RESEARCH AT TEOTIHUACAN

[354] General Session · ADVANCES IN GEOARCHAEOLOGICAL RESEARCH METHODS II

[355] General Session · ARCHAEOLOGY IN SOUTHEAST ASIA II

[356] General Session · WESTERN ASIAN ARCHAEOLOGY II

[357] Symposium · CRAFTING THE COMPLEX: MATERIAL CULTURE AND THE RISE OF COMPLEXITY IN FORMATIVE MESOAMERICA

Precolumbian Mesoamerica was home to several distinctive cultural groups. While these cultural groups were sometimes separated by hundreds of years, they were all united by several common features, including, but certainly not limited to, the creation and use of stylistic cultural and ritual objects, the construction of monuments such as stone pyramids, hieroglyphic writing, and a similar worldview conceptualizing ritualized blood sacrifice for the long-term benefit of the community. Before each of these cultural groups became the state-level organizations for which they are best known, they existed as small communal groups, likely bound to one another by kinship and reciprocal obligation. These cultural groups created similar types of artifacts and used them in similar ways in their daily lives. Over time, sometimes a long time, these cultural groups grew more and more complex, both socially and politically, eventually becoming the type of societies in which they are best known today. This session explores the creation and use of material culture among some of the various cultural groups that lived in Formative period Mesoamerica and how the use of material culture can illustrate growing social, economic, and political complexity.

[358] General Session · INCAN ARCHAEOLOGY II

[359] General Session · PERUVIAN ARCHAEOLOGY II

[360] General Session · CULTURAL HERITAGE ISSUES AND OPPORTUNITIES

[361] Forum · CROSSING THE LINE: THE INVESTIGATION OF PROBABLE BURIALS AT THE INDIAN SHAKER MOTHER CHURCH

In March of 2015 construction workers excavating the foundation of a new home site on property adjacent to the Indian Shaker Mother Church near Mud Bay in Thurston County, Washington, unearthed artifacts suggestive of a burial. Subsequent investigation of the site by the Department of Archaeology and Historic Preservation and Interested Affected Tribes with support by representatives of the Indian Shaker Church resulted in the recovery of additional artifacts and the delineation of a feature suggestive of a historic Native burial. Another possible burial was also identified. This forum gathers tribal and non-tribal cultural resource managers involved in the project to present and discuss the project, adversities and bureaucracies encountered, teamwork, and outcome.

[362] Forum · ADVANCES IN MANAGEMENT FOR MILITARY CULTURAL RESOURCES PROGRAMS

(SPONSORED BY MILITARY ARCHAEOLOGICAL RESOURCES SUBGROUP [MARS])

Although it is not widely known, many U.S. military installations have some of the most innovative and holistic cultural resource management programs in the country. This forum will explore in depth some of the successful cultural resource management strategies used by the military. The primary focus will be on cooperative and proactive approaches highlighted by technological advances in cultural resource management.

[363] Forum · ARCHIVES IN CONTEXT: ISSUES OF TIME, SPACE, AND SCALE

Collections contain more than cultural objects, also including items such as field documents, photos, and analyses in paper and digital form. The management of the entire collection as an archive presents many issues to the institution housing these materials whether inside a museum, repository, cultural center, laboratory, or so on. Issues around housing, access, usability, protocol, standardization, and preservation are just a few areas of concern that have ethical implications. This forum moves a conversation forward that began at the 2016 SAA meeting in Orlando by specifically targeting the ethical implications of archival work and how stakeholders affect and are affected by archival collections. Forum organizers are specifically interested in bringing together individuals with international experience knowing that particular issues are scalar and their solutions are not universal. It is important that different voices are heard and acknowledged to better understand what is at risk and how these issues might be addressed.

[364] Poster Session · NORTH AMERICA: SOUTHEAST I**[365] Poster Session · NORTH AMERICA: SOUTHEAST II****[366] Poster Session · HERITAGE ISSUES AND OPPORTUNITIES IN THE AMERICAN SOUTHWEST****[367] Poster Session · NORTH AMERICA: GREAT BASIN****[368] Poster Session · NORTH AMERICA: SOUTHWEST****[369] General Session · CURRENT RESEARCH ON MAYA IDENTITY AND SOCIAL COMPLEXITY****[370] General Session · ARCHAEOLOGY OF THE CARIBBEAN II****[371] General Session · ECOLOGICAL APPROACHES IN ARCHAEOLOGY****[372] Lightning Rounds · INSTITUTE FOR DIGITAL ARCHAEOLOGY METHOD AND PRACTICE PROJECT REPORTS**

The reports included in this session represent some of the projects produced by participants in the NEH-funded Institute for Digital Archaeology Method and Practice, which included two in-person workshops in August 2015 and August 2016, and digital communication and support over the intervening year. Co-PI's for the Institute were Ethan Watrall and Lynne Goldstein, and the workshops took place at Michigan State University. Projects represent many archaeological interests and skills, and participants included a range of archaeologists: graduate students, faculty, university administrators, museum professionals, CRM-practitioners, and government archaeologists. Each participant spent the year focused on a specific archaeological project, one of whose goals was to produce a forward-facing digital product accessible by the public (where public might be the general public or specific audiences).

[373] Symposium · AZTEC AT THE CROSSROADS AND IN THE CROSSHAIRS: 101 YEARS OF RESEARCH IN ONE CONVENIENT SYMPOSIUM

A century (and a bit) of research has been conducted at Aztec Ruins and it is time for a new synthesis. This symposium fuses data both old and new to situate Aztec as the preeminent Southwest site of the thirteenth century. A multi-scalar approach with data from excavation, artifact analyses, and legacy data investigations are presented with an eye toward addressing gaps in our understanding and are situated in the twenty-first-century debate of Chaco (What Came After, and How Aztec Fits?). With our dramatically improved understanding of Aztec's role in Pueblo history, these papers will evaluate the current state of Aztec archaeology; update on recently completed field, laboratory, and archive work; and evaluate the prospect of future research.

[374] General Session · ARCHAEOLOGY IN OCEANIA**[375] General Session · ROCK ART RESEARCH****[376] General Session · LITHIC STUDIES****[377] General Session · ARCHAEOLOGY IN THE SOUTHEASTERN UNITED STATES****[378] Symposium · WHALES AND WHALING: NEW PERSPECTIVES AND APPROACHES FOR DOCUMENTING LONG-TERM EXPLOITATION OF CETACEANS**

Human have been exploiting whales and other large marine mammals for thousands of years. Often initially focused on the opportunistic use of stranded carcasses, active whale hunting technologies and strategies emerged worldwide in different times and places. In spite of their importance as sources of food, fuel, and raw materials, there are fewer archaeological studies of cetaceans

than any other hunted mammal group. Today, cetaceans are among the most threatened groups of mammals, due to dramatic global declines resulting from industrial overharvesting and other anthropogenic influences. Archaeology has an important role to play not only in deciphering the timing, sociocultural context, and technological developments of active whaling, but also in providing essential baseline information on the past geographical distribution and abundance of now-threatened species. This session will explore ongoing challenges and new perspectives for documenting past cetacean exploitation from a wide range of geographic areas and time periods. Potential examples include (but are not limited to) historical, archaeological, morphological, and molecular approaches for reconstructing the timing, intensity, technology, and socioeconomic importance of cetacean exploitation, and documenting both natural and anthropogenic impacts on large marine mammal populations worldwide.

[379] Symposium · ADORNMENT, PERSONAL ORNAMENTATION, AND THE CONSTRUCTION OF IDENTITY: A GLOBAL ARCHAEOLOGICAL PERSPECTIVE

Items of personal adornment are found in archaeological contexts all over the world. While the specific meanings ascribed to these objects likely varied widely in the past, their social values are generally interpreted in relation to individual or group identity. Recent research highlights the ways in which personal ornaments served integral roles in the creation, maintenance, and negotiation of different aspects of identity, such as gender, age, social status, ethnicity, lineage or group affiliation, and participation in ideological and power structures. In some cases, these objects were vital to social transactions, ritual performances, the creation of social memories, the legitimation of authority, or the renewal of the existing social order. In contemporary work, these research issues are increasingly examined within the frameworks of embodied practice and materiality. In these approaches, the production, circulation, and discard of material objects create, reproduce, and transform the contours of the social world, defining relationships between individuals, social segments of various scales, and both the natural and cultural landscapes. The papers in this session present recent research on objects of adornment from a variety of geographic and temporal contexts, focusing on the ways they were used to construct and negotiate different elements of social identity.

[380] Symposium · TRAPS, WEIRS, PONDS, AND GARDENS: EXPLORING THE SOCIAL AND ECOLOGICAL SIGNIFICANCE OF AQUATIC SUBSISTENCE FEATURES

Aquatic subsistence features are used cooperatively by cultural groups around the world; common examples include fish traps and weirs, clam gardens, and fish ponds. Aquatic foraging and aquaculture practices such as these are highly varied and operate in different dimensions that are structured by both social and environmental parameters. This perspective comes to us via multi-method anthropological approaches incorporating ethnography, oral history, and archaeology. As archaeological treatments have shifted toward aspects of practice, history, landscape, ontology, sociality, and human-environment interactions, our knowledge of customary fishing and shellfishing practices is now positioned to inform on much more beyond subsistence strategies. Recent topics include labor and community organization, ownership, territoriality, religion, ritual, technology, identity, landscape modification, resource management, and long-term change and continuity in practices. Also, in light of growing concerns regarding climate change and the potential loss of archaeological resources along the coast, there has been an increase in multidisciplinary research highlighting local indigenous knowledge and the role that maritime subsistence practices play in social resiliency and sustainability. This session explores the global diversity and the social and ecological significance of past and present aquatic subsistence features and practices, linking together common anthropological and archaeological themes in a holistic manner.

[381] Symposium · ANCIENT CALIFORNIA: RECONSTRUCTING LIFEWAYS WITH BEHAVIORAL ECOLOGY MODELS

Research in California has long been at the forefront in the adaptation of economic and behavioral ecology models for application to the archaeological record. This symposium presents a collection of new investigations of prehistoric foraging populations in California focused on reconstructing patterns of reproduction and population growth, subsistence, and intensification; settlement patterns; and the emergence of a monetized economy. Contributors employ a range of models to demonstrate the adaptive flexibility that resulted in unparalleled hunter-gatherer population density and diversity of sociopolitical complexity in California.

[382] Symposium · LANDSCAPES OF CHANGE: INTEGRATED SOCIO-ECOLOGICAL HISTORIES IN THE CHICAMA VALLEY, PERU

Growing research demonstrates that Peruvian coastal valleys are not static oases cutting the desert, but dynamic environments shaped by millennia of climatic variability and anthropogenic change. Despite rich cultural, climatic, and biotic data, we lack integrated histories that comprehensively synthesize the evolution of socio-ecological relationships. Importantly, we have little understanding of how recursive ties between environmental change (both natural and anthropogenic) structured societal development, nor how legacies of change resonate in modern ecologies. This symposium presents a socio-ecological synthesis of the Chicama Valley, a key Andean region. We develop a platform for integrating cross-disciplinary, multi-project information to develop new interpretations of the valley's historical ecology as a cohesive entity. Thematic papers synthesize archaeological, paleoclimatic, geomorphologic, geospatial, and agronomic data. We discuss demographic and settlement dynamics, environmental change precipitated by premodern communities, and the impacts of climatic trends to understand the effects of path dependencies and disturbance socio-natural ecology of Chicama. We hope to establish a collaborative framework for effectively integrating information from independent research initiatives into a regional dataset, so that we can address broader socio-ecological questions. This symposium identifies crucial lacunae requiring future investigation so that the full importance of recursive socio-environmental dynamics can be better understood.

[383] Symposium · TERRITORIAL BEHAVIOR AND ECOLOGY

Human territorial behavior encompasses a broad range of variation. While basic territory development may begin simply by excluding others through the habitual or persistent use of the same location, such behaviors can extend to the active defense of resource patches and the emergence of stable boundaries. Anthropologists have long relied on ecological models to help explain this variation, and new approaches from behavioral ecology are beginning to expand our understanding of territorial behavior, its causes, and its effects. Here we assemble researchers focused on explaining variation in territorial behavior across western North

America through ethnographic and archaeological case studies. Papers in this session will offer new insights on territorial behavior, providing a foundation for future work on the subject.

[384] Symposium · THE CAIMAN'S (AND FROG'S) REVENGE: INTERSECTING PAPERS IN HONOR OF PETER G. ROE

Peter G. Roe earned his PhD at the University of Illinois, Champaign-Urbana under the direction of Donald W. Lathrap. Following in Lathrap's large footsteps, over the past four decades Roe has carried out novel and pioneering research in a number of areas, including cosmology and religion; art, iconography, and design analysis; technology; ethnohistory; and ethnoarchaeology. Uniting these threads has been his abiding commitment to South American and Caribbean archaeology and ethnography. In this session, colleagues and former students present papers that relate to Professor Roe's varied interests.

[385] Symposium · AN OTHER-THAN-HUMAN BEING: THE ARCHAEOLOGY OF BEARS IN NORTH AMERICA

Ever since Irving Hallowell's classic 1926 ethnographic study of the special mythic status of bears in the Subarctic, anthropologists are generally aware that many peoples throughout the world have treated bears as far more than a subsistence resource, something more akin to another kind of human or an other-than-human being. Hallowell attributed that special relationship between Subarctic humans and bears to some striking parallels between bear and human behaviors and physiologies. If that were indeed the case, then one would expect to see similar relationships outside the Subarctic, although in fact Hallowell found little evidence for the special treatment of bears elsewhere in North America. Archaeological and historical research over the last nine decades, however, has produced a vast amount of as yet unsynthesized information on the roles of bears in Native American beliefs, rituals, and subsistence. Taking into account ecological variables of bear demography, reproductive rate, habitat use, seasonal availability, and trophic level, we invite participants in this session to draw on new and existing data to reconsider zooarchaeological and other evidence of bear hunting and use in light of the range of relationships that existed between bears and humans across the millennia in Native North America.

[386] Symposium · EMERGING FROM THE PLACE OF DARKNESS: SUBTERRANEAN ARCHAEOLOGY IN MESOAMERICA

Mesoamerican cave archaeology has continued to amplify its areas of interest, appropriating the study of a range of constructed features so that the term Subterranean Archaeology appears to be a more appropriate term. This grew out of investigators using the term "cave" in the sense of the Maya word *ch'e'en*, which indicates not simply a cave but also a large number of other holes that penetrate the earth. It also recognizes that indigenous peoples show far less concern for whether the hole is of a natural or a human origin. Recent research continues to demonstrate that traditional caves are important landmarks in the landscape but, additionally, archaeologists have begun to show that many more features were marked by ancient peoples as having sacred significance. This session brings together fresh perspectives on the subject.

[387] General Session · CURRENT PERSPECTIVES ON PACIFIC NORTHWEST COAST ARCHAEOLOGY

[388] Symposium · FROM BIRDSEED TO SUPERFOOD: *CHENOPODIUM* CULTIVATION AND MANAGEMENT ACROSS THE GLOBE

Seeds of the genus *Chenopodium* are often ubiquitous and abundant in archaeological sites across the globe, yet our understanding of their role in human societies varies from region to region. Cultivation of chenopods has long been recognized in the Andes and Mexico, yet their diversity and unique histories of domestication are still being investigated. Through years of morphological and genetic work, researchers have demonstrated that the Native Americans of eastern North America independently domesticated their own chenopod species. Building on these advancements, researchers working across Eurasia and in other regions of the Americas are reassessing the status of the chenopods found in their sites. This session will highlight recent discoveries of both cultivated and intensively managed chenopod populations, shedding new light on a genus whose important role in human history has long been overlooked.

[389] Symposium · SHORT-TERM OCCUPATIONS IN PALEOLITHIC ARCHAEOLOGY

Critical aspects on the understanding of prehistoric lifestyles are how hunter-gatherers moved on the landscape and how they organize their technological and subsistence strategies in relation with climatic fluctuations and environmental changes. Ethnographic studies documented that in homogeneous environments, where resources are particularly scattered on the region, foragers tend to move frequently their central base. Conversely, in areas where resources are patchy due to seasonal climates, logistical mobility is preferred. In the last decades, many studies applied these ethnographic concepts to understanding the mobility patterns in archaic humans but, in several regions, it is still unclear how the environment influences hominins displacement strategies and whether biological and technological differences are also reflected in the management of the territory. This symposium aims to explore the issue of hunter-gatherers mobility focusing on short-term anthropogenic occupations. This type of mobility strategy might generate a variety of archaeological contexts such as residential bases, locations, hunting stations, or temporary camps. The comparison of these short-term occupations between different regions will contribute to a better understanding on how hunter-gatherers adapted and moved in different climatic and environmental areas. Speakers are very welcome to present new data, as well as theoretical and methodological approaches.

[390] General Session · CERAMICS IN SOUTHWESTERN ARCHAEOLOGY

[391] Symposium · MOLDING MATTER: TECHNOLOGIES OF REPRODUCTION IN THE PRECOLUMBIAN AMERICAS

Technologies of replication and reproduction are most commonly associated with the industrial advances of the recent past. Yet objects have been produced en masse for thousands of years across the globe, including in the precolumbian Americas. Rather than emphasize the economic or political implications of mold-made and stamped objects, however, this session focuses on their

cultural implications. Creating iterations of the same object from a shared mold implies an intended distribution beyond that of the individual patron or consumer, suggesting different motivations, contents, and intended uses. How did these processes compare to production of individualized objects that were often intended for a specific client, such as hand-painted ceramic vessels, feather capes, or woven mantels? What does the existence of such technologies suggest about indigenous concepts of an "original" vs. a "copy"? Despite the technological potential for large-scale reproduction, not all mold-made objects were created or distributed in equal quantities. What do differences in the proliferation of these goods indicate about their cultural value and use? Individual papers will examine the cultural significance of diverse objects replicated with molds and stamps in ancient Mesoamerica and South America.

[392] Symposium · A MATERIAL WORLD: COLLABORATIVE RESEARCH IN ART, ARCHAEOLOGY, AND MATERIALS SCIENCE IN THE STUDY OF THE ANCIENT AMERICAS

This session features collaborative research in art, archaeology, and materials science in the study of the ancient Americas. Collaboration between scientists and social scientists or humanists has long been a part of archaeological studies, yet recent decades have seen a flourishing in productive collaborations between archaeologists and art historians with materials and conservation scientists. This panel explores new directions in such interdisciplinary collaboration, particularly regarding how new scientific analyses can help us understand ancient technologies, artists' decisions in the choice of materials or modes of manufacture, and the meaning of materials to artists and users. In some cases, materials science reveals information that can confirm or refute what is suggested from stylistic or other analysis, particularly regarding sharing of materials and technologies across cultures. In others, new technologies of excavation, preservation, and analysis give insight into the use of organic materials, which allow us both to see a wider range of materials used by artists and to help re-create the ancient sensorial world and ask new questions about the experience of artists and users in the ancient past of the Americas.

[393] Symposium · THE NORTH AMERICAN CONTINENTAL SYSTEM: INTERACTION AND EXCHANGE ACROSS THE CONTINENT

The precolumbian peoples of North America inhabited a "known world" that stretched, at a minimum, from Canada to Panama. Archaeological discoveries show that items such as shell, obsidian, and bead-types were conveyed over thousands of miles, while ethnohistoric accounts document the movement of people across equally vast distances. Just as important, shared stories, oral narratives, ideologies, and traditions point to histories of interaction between distant places stretching deep into antiquity. How should archaeologists deal with these long-distance connections, and what do these connections mean for cultural narratives and models of social change we construct for regions where we work? This session will bring together archaeologists working in different parts of North America to compare our continent's history of interregional interactions. By patching together a mosaic of different stories of interaction we will build toward a bigger history of North America's dynamic past that will help us understand its unique indigenous present.

[394] Symposium · COLLABORATIVE AND COMMUNITY ARCHAEOLOGY

This session addresses archaeology projects involving varied and innovative collaborative efforts that focus on partnerships with local communities.

[395] Symposium · MATERIAL ENCOUNTERS AND INDIGENOUS TRANSFORMATIONS IN THE EARLY COLONIAL AMERICAS

(SPONSORED BY ERC-NEXUS1492)

Early colonial encounters with Europeans initiated transformations in indigenous social, cultural, and material worlds. Archaeologists have recently come to investigate the varieties and complexities of indigenous colonial dynamics. Scholars increasingly emphasize indigenous agencies in negotiating colonial encounters and appropriating European material culture through gifts, trade, or imitation. This has resulted in exploring why indigenous people adopted or resisted foreign objects, and how such differential choices not only altered indigenous material assemblages, but also affected existing social, political, and economic structures. Over the past thirty years, our understanding of material encounters in the colonial Americas has advanced largely through studies based on cases from North America, using updated theories on, for example, consumption, hybridity, and entanglement. Building upon these efforts, this session will specifically target the hitherto underrepresented Caribbean and its surrounding mainlands, including northern South America, Central America, and the southeastern United States, shifting the focus to fifteenth- to eighteenth-century Spanish colonialism. Participants will use indigenous long-term historical trajectories to discuss how foreign goods were differentially employed across time, space, and scale; how these were considered within indigenous ontologies and value systems; what implications their adoption had for larger indigenous society; and which theoretical trends best help us understand indigenous material practices.

[396] General Session · ARCHAEOLOGICAL APPROACHES TO RITUAL AND RELIGION I

The ANNUAL MEETING of the Society for American Archaeology provides a forum for the dissemination of knowledge and discussion. The views expressed at the sessions are solely those of the speakers and the Society does not endorse, approve, or censor them. Descriptions of events and titles are those of the organizers, not the Society.

ABSTRACTS OF INDIVIDUAL PRESENTATIONS

2015 Field School, NMSU [303] see Duran, Paul A.

Abarca Labra, Violeta [231] see Swift, Jaime

Abbott, Callum (Department of Anthropology, University of Victoria)

[172] *Lithics and Learning: Toward a Heart-Centered Lithic Analysis*

Both archaeologists and the knappers who created the lithics we recover are skilled practitioners implicated in a genealogy of technological practice. These living, thinking, and feeling beings make tools with their hearts and their minds—two inseparable components of the complete corporeal experience. A heart-centered approach to lithic analysis offers insights about the social and emotional contexts of situated learning in which ancient and contemporary makers of stone tools engage. The process of co-construction between the makers of material culture and the things they make means they actively shape each other across time and space. This has implications for communities of practice in the past as well as the present. Therefore, tracking the choices, movements, and gestures made along the chaînes opératoires of stone tool production positions the (re)creation of embodied knowledge within the materially, environmentally, and socially mediated world of learning and enskilment. In this paper, I explore the findings of a diachronic analysis of three lithic assemblages from Quadra Island, British Columbia and propose a methodology for conducting a heart-centered lithic analysis. I incorporate qualitative and quantitative data of the artifacts themselves, their relation to communities of tool-makers, and my own experience of learning to make stone tools.

Abbott, David [335] see Craig, Douglas

Abdollahzadeh, Aylar [40] see Leader, George

Abamiuk, Marc (California State University Channel Islands)

[298] *Preliminary Findings at the Quebrada de Oro Ruins: Shining New Light on a Classic Maya Site We Thought We Knew*

The Quebrada de Oro Ruins comprise the remains of one of four known Classic Maya centers located in Bladen Branch region of the Maya Mountains of southern Belize. Initially recorded in the 1970s, the site has not garnered much attention by archaeologists due to its remoteness. However, this has not deterred cartographers from noting it as a significant landmark or archaeologists from asserting that it played an important role in ancient times. This contrasts with the views of the few archaeologists who have visited the site only long enough to report on the site's rather typical layout containing modest-sized structures. So what do we really know about the Quebrada de Oro Ruins? Recent investigations of the site have been launched in pursuit of an answer to this question. This paper describes the preliminary findings of these investigations and touches on what they mean for our understanding of the Quebrada de Oro Ruins and the surrounding area during the Classic period.

Abrantes, Joana [86] see Cardoso, Hugo

Abrego Rivas, Alejandra [91] see García Ferrusca, Víctor Hugo

Abtosway, Matthew

[326] *Exploring the Viability of Geochemically Sourcing Elaborate Metates through XRF Spectroscopy*

The Central American elaborate metate is a perplexing group of ground stone artifacts. Their function continues to be the subject of debate, with interpretations ranging from hallucinogenic and food preparation to ritual seating. It is difficult to deny, however, the substantial labor investment represented and likely symbolic significance. X-ray fluorescence spectroscopy has proven an invaluable tool in the nondestructive geochemical sourcing of archaeological obsidian, providing insights into exchange and the relationships between sometimes distant cultures. Less homogeneous materials, such as basalt and andesite, offer a distinct set of challenges compounded by the size of the artifacts themselves, however the possibility of illuminating the origins and mobility of ground stone merits study. The Archaeology Museum at the University of Calgary offered a unique opportunity to test and perfect a methodology to overcome these challenges prior to application in a less accommodating field environment. A selection of complete flying panel, effigy and elaborate basin metates with little to no provenience were selected for spectroscopy with a portable XRF unit. Cluster analysis was conducted with the produced spectra, as well as those recorded in the Rutgers University Central American Geochemical Database.

Abulafia, Talia (Talia Abulafia), Ofer Marder (Ben Gurion University of the Negev) and Omry Barzilai (Israel Antiquity Authority)

[338] *The Lithic Industries from Area C: Typo-Technological Characteristics*

The lithic assemblages from Area C derive from a thick section composed reworked terra rossa soil of dark brown to reddish brown, loose clay to silty clay loam with abundant biogenic and anthropogenic materials subdivided into eight units. The depositional sequence of the units is in a chronological order as shown by radiocarbon and U-Th dates (Hershkovitz et al., 2015). A typotechnological analysis of the all units suggest a shift in industries though the sequence. Unit 2–3 are small assemblage which seems to be associated with post-Aurignacian/Aurignacian industry. Unit 4 is Aurignacian as it includes typical components such as twisted bladelets, carinated/nosed end-scrapers, flat end-scrapers, dofour blades, burins and bone and antler tools, and preference for flake production. Unit 5 contains both Aurignacian and Ahmarian components. The upper part resembles unit 4. While the rest show Aurignacian characteristics and some Ahmarian as well. Unit 6 the upper part is also mixed, but the lower shows more Ahmarian elements. Unit 7 represents a homogenous unit that shows a clear preference for bladelet production. The El-wad points and its variant are very common for the Ahmarian as well as a few MP artifacts that seem to extend to Unit 8.

Abulafia, Talia [338] see Goder Goldberger, Mae

Acabado, Stephen (UCLA)**[285]** *Zones of Refuge: Resisting Conquest in the Northern Philippine Highlands through Agricultural Practice*

The origins of the extensive wet-rice terrace complex in Ifugao, Philippines have been recently dated to ca. 400 years ago. Previously thought to be at least 2,000 years old, the recent findings of the Ifugao Archaeological Project show that landscape modification for terraced wet-rice cultivation started at ca. 1600. The archaeological record implies that economic intensification and political consolidation occurred in Ifugao soon after the appearance of the Spanish empire in the northern Philippines (ca. 1575). The foremost indication of this shift is the adoption of wet-rice agriculture in the highlands, which served as zones of refuge for local populations. I argue that the subsistence shift was precipitated by political pressures and was followed by political and economic consolidation. Wet-rice agriculture was an expression of imperial resistance; it also facilitated political integration. Using paleoethnobotanical, faunal, and artifactual datasets, this paper documents the process that allowed the Ifugao to resist conquest.

Acabado, Stephen [198] see Lauer, Adam

Acebo, Nathan (Stanford University)**[98]** *Reassembling Black Star Canyon*

The Santa Ana mountain landscape of contemporary Orange County, California, has been dichotomously characterized as “a wild frontier” and “a tamed indigenous space” where the material and social histories of indigenous communities are downplayed and legacies of Spanish, Mexican and American colonial society are both solidified and continued. Within this landscape, the Black Star Canyon Village site (CA-ORA-132) objectifies this binary historicity as the site constitutes a prehistoric/historic period landmark associated with the local history of the “Battle of Black Star Canyon,” in which Native Americans were accused of stealing horses and were subsequently massacred in 1831 by American fur trappers. This paper seeks to complicate the fractured modern narrative of the site by exploring how prehistoric and colonial era materialities of the mountain afford local and nonlocal indigenous practices of social and economic subversion while challenging dominant historical accounts of extinction and indigenous passivity.

Acevedo, Agustín [62] see Franco, Nora V.

Acosta, Jocelyn [11] see Saldana, Melanie

Acosta, Marcelo (CÉLAT—LAVAL University)**[292]** *Materializing Ideas: Preliminary Analysis of Roof Tiles Images from the Nuestra Señora De Loreto I and San Ignacio Mini I Missions (1610–1631)*

In this paper we will be discussing the iconography of the roof tiles found in the primitive missions of Nuestra Señora de Loreto and San Ignacio Mini located in the region of the Guairá. The aim is to analyze the material and symbolic universe that circulated in the primitive Jesuits missions (1610–1631). In order to achieve this goal, we will first analyze the technologies of production, the iconographic types and interpret the possible meanings acquired in the representations shown on the roof tiles. So far the archaeological research prioritizes the urban organization and the materials in the missions but omits the symbolic component that gave sense to the space and to the objects. The reductions were spaces of evangelization where circulated religious messages in two directions: from the evangelists to the Guarani, and also from the Guarani to the Jesuits. To accomplish this, they used different means of communication. The analysis of the technologies and the images on the roof tiles of both reductions allows us to analyze the technical and symbolic speeches of the material culture. We finally discussed above the discourse on the roof tiles and their symbolic role in the first period of evangelization.

Acosta Alejandro, Manuel [349] see Gallegos Gomora, Miriam Judith

Acosta-Ochoa, Guillermo (Instituto de Investigaciones Antropológicas), Emily McClung de Tapia (Instituto de Investigaciones Antropológicas), Diana Martínez-Yrizar (Instituto de Investigaciones Antropológicas), Carmen Cristina Adriano-Morán (Instituto de Investigaciones Antropológicas) and Jorge Cruz-Palma (Instituto de Investigaciones Antropológicas)**[13]** *Prehispanic Plant Remains from Altica, Teotihuacán Valley, Mexico*

Altica, situated in the southeastern sector of the Teotihuacán Valley, represents the earliest known farming community in this region. Its importance lies in the potential for the recovery of evidence for domestic plant use by these early inhabitants. Plant remains recovered over several decades in the Teotihuacán Valley provide an idea of the predominant plant communities in the area during the Early-Middle Formative, an indicator of local environmental conditions. Preliminary results from the analysis of macrobotanical remains recovered from excavation contexts, together with phytoliths and starch grains from selected stone tools contribute to an understanding of local economy and agricultural production in this community.

Acuña, Mary Jane (Washington University in St. Louis), Varinia Matute (Calgary University), Carlos Chiriboga (Yale University) and Francisco Castañeda (Universidad de San Carlos de Guatemala)**[131]** *The Cultural and Natural Landscapes of El Tintal, Guatemala: Preliminary Results of the Application of Airborne Lidar*

In this paper, we present the results of our preliminary analysis of the application of lidar (light detection and ranging) imagery of the archaeological site of El Tintal in northern Guatemala. El Tintal is an extensive site with over 800 known buildings distributed in an area of about 12 km². From the Preclassic through the Late Classic Periods (ca. 400 BC to AD 850), the cultural settlement developed in direct association with the natural landscape marked by extensive bajos (seasonally inundated natural depressions). Initial mapping efforts and pedestrian surveys have revealed that in addition to having adapted construction to the natural terrain, the population of El Tintal also invested significant efforts in water management systems throughout the site.

Acuña, Mary Jane [337] see Matute, Varinia

Adam, Elhadi [57] see Biagetti, Stefano

Adams, Aron, Lori Reed (NPS) and Linda Scott Cummings

[373] Closing the Gap at Aztec Ruins: Refining the Dating Sequence Using Corn and Pottery

Excavation of a recent test unit at Aztec West revealed stratigraphic deposits yielding corn samples that were well distributed throughout. The primary research objective was to use Accelerator Mass Spectrometry (AMS) Radiocarbon dating to date charred corn from the test unit and compare the results with date ranges for pottery from the same levels. A tree-ring date of AD 1130 was also obtained from charred wood in a pit feature below the levels yielding corn, suggesting that the deposits, corn, and pottery in the levels above post-date AD 1130. AMS dates on the corn samples correlate well with the relative ceramic dates and the tree-ring date, supporting the initial interpretations of the stratigraphy in the test unit. The study provides well-dated evidence of the McElmo phase occupation of Aztec West, which Earl Morris doubted during his early twentieth-century excavation of the site.

Adams, Christopher [4] see Campetti, Casey

Adams, Karen (Crow Canyon Archaeological Center)**[84] Taming Wild Plants: How Hard (or Easy) Can It Be?**

Ancient diets in the Hohokam area of central and southern Arizona included indigenous domesticates. Evidence for domesticated Little Barley (*Hordeum pusillum*), Mexican crucillo (*Condalia wernockii*), and amaranth (*Amaranthus*) rests on morphological changes. Range extensions into higher/lower areas are cited for management of agaves (*Agave*) and cholla (*Opuntia*) plants. Here I consider the process of domestication, and suggest that one or more mutations in nature plus one observant human may be all that was needed to domesticate some plants. Recent recognition of domesticated Little Barley grains in a Basketmaker III (AD 750) site in southwestern Colorado raises the issue of independent domestication.

Adcock, Sarah E. (University of Chicago)**[285] Thinking through Zooarchaeological Approaches to Empire and Environment**

In this paper, I explore the intersection of empire and environment in imperial and post-imperial contexts using the collapse of the Hittite empire and its aftermath in central Turkey around 1200 BC as a case study. More specifically, I mobilize zooarchaeological evidence from the Hittite capital of Hattuşa and from Çadır Höyük, a rural town, in order to discuss how we might distinguish between political, economic, and climatic factors in our interpretations of the relationships between empire and environment. This analysis focuses on quantitative models commonly used by zooarchaeologists to characterize interactions between humans and the environment. Here, I use these models to facilitate synchronic and diachronic comparisons between capital and provincial town in both pre- and post-collapse contexts. At the same time, I explore the possibilities and limitations these models hold for increasing our understanding of the relationships between empire and environment.

Adderley, Paul (University of Stirling), Mitchell Power (University of Utah, USA) and Valery Terwilliger (University of Kansas, USA)**[171] Geoarchaeological Assessment of Long-Term Site- and Field-Management Characteristics at the Pre-Aksumite Site of Mezber, Tigray Plateau**

The ancient polities of the Tigray Plateau and this region's pronounced climatic variations combine to create a research paradigm where social-environmental interactions can be considered over the long-term. Existing regional-scale indicators suggest that human responses to climate variability differed between peoples, polities and time-periods. Framed by an ongoing regional study designed to examine high-resolution climate and environmental markers at a broad-spatial scale, the study of the Pre-Aksumite (1600 BCE—1 CE) site of Mezber allows more refined a site-level understanding of anthropogenic interactions to be developed, both site-use and agrarian land management. This paper considers a set of geoarchaeological measurements and land-use proxies, including micromorphology, image analysis and inorganic chemical analysis of the sediments for this site. The complex dynamics between regional climate variations and indicators of past fire-husbandry and land management at this site are then explored.

Adderley, Paul [171] see Terwilliger, Valery

Admiraal, Marjolein (University of Groningen)**[229] Organic Residues from Durable Vessels in Prehistoric Southwest Alaska**

Prehistoric people of coastal southwest Alaska used clay and stone vessel technologies for the past 3,000 years. Despite the challenges that the cold and humid subarctic climate posed to the procurement of clay and the drying and firing of pottery, people invested their valuable time and energy in the manufacture and maintenance of these durable vessels. Why? What role did container technologies play in the wider process of food procurement and processing? An increased focus on marine resources seems to have led to the emergence and spread of pottery in Alaska. Vessels may have been used for the rendering of marine mammal fats into oil to be used as fuel. To test this hypothesis lipids, isotopes, and proteins from food residues of about 100 vessels from 32 archaeological sites in the Aleutian Islands, Alaska Peninsula and Kodiak Archipelago have been analyzed at the BioArCh laboratory of the University of York, UK. Establishing the contents of the vessels provides direct evidence for vessel function and contributes to the greater understanding of food technologies in prehistoric Alaska.

Adovasio, J. M. (Florida Atlantic University)**[377] Perishable Artifacts from the Old Vero Site (8IR009), Indian River County, Florida**

Despite depositional conditions inimical to the preservation of plant fiber or wood-derived artifacts, several such objects have been recovered during the ongoing re-excavations of the Old Vero Site (8IR009) in Indian River County, Florida. These include a minute fragment of charred, three ply, braided cordage with a contiguous underlying date of ca. 9,000 calendar years ago and a specimen of charred, flexible basketry or textile directly dated to 7989 ±19 calibrated radio carbon years ago. The technology of both specimens is consistent with analogous forms recovered from the celebrated Windover Bog site in Brevard County, Florida. The construction attributes of the Vero specimens are described and the potential significance is addressed.

Adriano-Morán, Carmen Cristina [13] see Acosta-Ochoa, Guillermo

Adriano-Morán, Carmen Cristina [293] see Pérez Pérez, Julia

Aebersold, Luisa [83] see Hart, Thomas

Ævarsson, Uggi [190] see Woollett, James

Agarwal, Sabrina (UC Berkeley)

[31] *Bone Remodeling Behavior across the Surfaces of the Skeleton as Biographical Windows*

The morphology of the whole skeleton is crafted over the life course by bone remodeling across its skeletal surfaces: the endosteal surface of its trabeculae, and on the periosteal, endocortical, and intracortical surfaces of its cortex. The behavior of each of these surfaces differs between individuals and populations resulting in some understood differences in bone morphology across human groups. But the skeletal surfaces are also differentially influenced during growth, aging, reproduction, activity, disease, and other aspects of life experience. Analyzing aspects of bone quantity and quality at these various bone surfaces can provide windows into bone remodeling events of the once living skeleton. This paper will demonstrate how scaling between this record of cellular activity at the level of tissue, bone, skeleton, and community, bioarchaeologists have the potential to reconstruct aspects of past life history. An appreciation of the biology that undertakes the construction of the skeleton at its most basic cellular level extends the concept of the osteobiography. At the same time, an appreciation of the biocultural influences on this basic cellular activity provides a more humanistic perspective on our on reconstruction of the person from the skeleton.

Agenten, Courtney (Project Archaeology), Jeanne Moe (Project Archaeology/BLM) and Tony Hartshorn (Montana State University)

[97] *Putting Archaeology Teacher Workshops to the Test*

Students are assessed constantly throughout the school year. As teachers we ask ourselves how do I know that the students understand the concepts and skills? Archaeology educators should be conducting the same kind of rigorous evaluation of the professional development courses we offer teachers. Challenging our profession to know where teachers are coming from, what their needs are, where we want them to go, and how we know that they learned. What prior knowledge do teachers bring to a workshop? Have they been exposed to inquiry-based learning? How do they feel about teaching archaeology? How will they use the educational materials in their classroom after attending? These questions and more are necessary to understand the purpose and outcomes of archaeology-centered professional development. Project Archaeology conducted a study of ten teachers who participated in a five-day course on a developing curriculum guide, Project Archaeology: Investigating a Roman Villa. The results of the research will inform future studies on how archaeology educators can conduct similar assessments of teacher pedagogical content knowledge to determine the efficacy of professional development for educators.

Agostini, Mark R. [34] see Catanach, Samuel

Agüero, Carolina (Instituto de Investigaciones Arqueológicas, Universidad Católica del Norte)

[134] *Intervención de la Textilería Local como Estrategia del Tawantinsuyo para Vincular a las Poblaciones de Atacama con el Noroeste Argentino (1350–1535 Dc)*

Los materiales textiles tienen la capacidad de contener información relacionada con situaciones de contacto cultural y el grado de intensidad de éstas. Bajo este principio se estudió en forma sistemática la textilería del sitio Doncellas en el Noroeste Argentino—tanto aquella que se encuentra en el Museo Etnográfico Juan B. Ambrosetti en Buenos Aires, como la porción depositada en el Museo del Pucará en Tilcara—y aquella proveniente de sitios del Salar de Atacama y de la cuenca del Loa, principalmente del sitio Cementerio Poniente de Quillagua. Esta tarea se realizó con el fin de obtener datos relevantes que ayuden a comprender la dinámica de las relaciones que existieron entre estos territorios vecinos durante los períodos Intermedio Tardío y Tardío. Los resultados de este análisis nos llevan a proponer que el nexo establecido entre ambos se habría desarrollado con mayor intensidad hacia 1350–1535 Dc, siendo posible asumir la existencia de un proceso expansivo que llevo a vincular ambos territorios, en asociación a los intereses del imperio Inka.

Aguero Reyes, Adriana (Independent)

[267] *Architecture and Figurine Art in Central Veracruz*

Terracotta figurine offerings as part of construction deposits are one of the traits that characterize the Classic period Central Veracruz culture. They are recurrent in both modest and monumental architecture, in sites of all ranks. In this they differ from ceramic figurine use in contemporary cultures, where they belong to the domestic and/or funerary sphere. This paper presents a case study on a series of figurine deposits of a palatial residence of the archaeological site of La Joya, showing that the qualities of size and finish and the form of disposing of the figurines will vary according to whether the deposit is placed at initial construction, rebuilding, or as part of a termination offering, reflecting different forms of ritual practice. An initial comparative analysis will evaluate if these patterns apply to other cases within the same culture area.

Aguilar, Joseph (University of Pennsylvania) and Robert Preucel (Brown University)

[34] *Seeking Strength and Protection: Tewa Mobility during the Pueblo Revolt Period*

The Pueblo Revolt period (1680–1700) was a time of considerable social unrest and instability for Pueblo Indian people. The return of the Spaniards twelve years after the 1680 revolt required new strategies of resistance. Mobility became a key form of resistance and, the Tewa world in particular, provided a landscape in which pueblo communities could seek the strength and protection to survive. Many families left their home villages and took refuge with their relatives on mesa villages and in isolated mountain camps. In some cases, Pueblo leaders sent their women and children away for safety and security. In this paper, we consider mobility among the Tewa people, across their landscape during the Spanish Reconquest, as resistance strategy. Particular attention will be paid to the mobility strategies of San Ildefonso Pueblo to mesatop and upland areas during the reconquest.

Aguilar, Felisa (Centro INAH Coahuila), Ana Rugerio (Dirección de Registro Público de Monumentos y Zona) and Ulises Cano (Dirección de Registro Público de Monumentos y Zona)

[328] *From Scientific Specimens and Curiosities of Nature to Heritage Assets: Its Listing in the Public Registry of Archaeological Zones and Monuments*

Fossils are physical evidence that provides important information in order to figure out and explain the origin and evolution of life on Earth. For this reason, an accurate recollection and preparation are necessary. A precise data collecting also is required. Fossils must be preserved in scientific collections where they will be studied and where they will receive the status of specimens. In addition, for non-scientists these objects could be curiosities of the past from Nature which are also objects for collecting. In Mexico, fossils are recognized as national heritage, nevertheless it was not until 1986 that INAH was designated as the institution in charge of them, having modified its Organic Law and having added the article 28bis to the Federal Law of Archaeological Zones and Monuments, Artistical and Historical. According to this, INAH executes different actions to fulfill these responsibilities, for not only scientific collections, but private too and paleontological sites. Generating data sheets of records with the final goal to extend the legal declaration of the existence of these goods. This tool was developed to follow up and have control of specimen records and legal protection, key aspects for conservation and protection of this heritage.

Aguirre, Alejandra (Proyecto Templo Mayor/UNAM)**[225]** *The Symbolism of the Animals Found inside Offering 125 of the Great Temple of Tenochtitlan*

In the seventh field season of the Templo Mayor Project, we discovered various ritual deposits in an inverted pyramidal monument located west of the monolith of the Tlaltecuhli Goddess. We determined that this space symbolized the threshold to the underworld, or realm of the dead. In this space we made the exceptional discovery of the Offering 125, associated with the ruler Ahuítzotl (1486–1502 CE). In this offering we found three flint knives that were dressed like Ehécatl-Quetzalcóatl (God of Wind). Two knives are decorated with spider monkey skin (*Ateles geoffroyi*) and in one case, a green stone duck effigy pendant. These elements were in association with two golden eagle skeletons (*Aquila chrysaetos*) and a wolf skeleton (*Canis lupus*). The employment of different symbolisms of animals refer to various aspects of Mexica cosmology. The animals occupy a specific location in the interior of the offerings and thus play a specific role within the offering's narrative.

Ahern, Kaitlin**[321]** *Reexamining the Identity of Reverential Termination Rituals in the Maya Lowlands*

In the pursuit to understand ancient Maya ritual, researchers have commonly relied upon the analysis of termination rituals and caches. In the early 2000s, Jonathan B. Pagliaro, James F. Garber, and Travis W. Stanton introduced a clarification of the terminology, differentiating between reverential and desecratory termination rituals. Following this publication, a surge of studies conceptualizing desecratory termination rituals emerged, while the literature on reverential termination rituals remained sparse. Even today, the interpretation of reverential termination rituals remains particularly broad and unclear. Specifically, there is no clear demarcation separating reverential termination rituals from dedication rituals or even from desecration termination rituals. This ambiguity has made it difficult to properly identify the occurrence of this type of ritual in the archaeological record. Therefore, it is necessary to reconceptualize reverential termination rituals and establish a more concise definition of this ritual act. This examination draws from various case studies from across the Central Maya Lowlands to establish a list of characteristics associated with reverential termination rituals.

Ahlrichs, Robert (UW-Milwaukee)**[4]** *Collecting Copper and Systematic Archaeological Analysis*

The Old Copper Complex is represented by tens of thousands of copper artifacts recovered from locations widely scattered across the landscapes of the Western Great Lakes. Many of these artifacts continue to be collected and curated by avocational archaeology enthusiasts with characteristically poor contextual information. Traditional scholarly study of this complex has been restricted to the consideration of copper as a symbolically potent object and the construction of artifact typologies. This has resulted in a lack of emphasis on the role that copper played in the subsistence and economic systems of the people who depended on it. This research addresses the acquisition, use, and discard of copper artifacts through the systematic study of the Jim Bussey Collection from both northern and southern Wisconsin localities. Morphological artifact types, their relative distributions through space and time, LA-ICP-MS based sourcing data, and use-wear patterns are used to develop an archaeologically useful dataset despite poor provenience.

[264] *Chair*

Ahlrichs, Robert [264] see Sterner, Katherine

Ahrens, Kami (University of Nebraska-Lincoln) and Phil Geib (University of Nebraska-Lincoln)**[368]** *Analysis of Human Hair Bands from Old Man Cave, Utah*

In the early 1990s, excavations conducted at Old Man Cave in southeastern Utah unearthed various Basketmaker II materials, including an incredibly well-preserved bundle of burden bands made from human hair, dog hair, and yucca cordage. Radiocarbon dating places the manufacture of these textiles between 170 BC and AD 135. The bundle, when unfolded, contained a complex set of artifacts, including two smaller fragments that appear to be carrying bands, and another far more unique woven artifact. Resembling a load-bearing strap, this wide-split woven band consists of two narrow tumpline-like bands joined at each end, displaying considerable upkeep and maintenance. Only one other artifact known to the authors bears a similar form, but the functions of both remain unknown. Regardless, these woven artifacts provide a case study for examining textile production methods and use in the San Juan region of the American Southwest. Analysis of fibers, twist, ply, weave, wear patterns, and predepositional repairs can help illuminate the method of skill transmission and cultural interactions that existed in preceramic Southwestern societies. The foundational knowledge for these and other analyses is established by a thorough examination of the artifacts at hand and relevant comparative pieces.

Aiello, Leslie [70] see Aldenderfer, Mark

Aikens, C. Melvin (University of Oregon)**[279]** *Discussant***Aimers, Jim (SUNY Geneseo)****[187]** *Maya E-Groups and the Nature of Science—Ours and Theirs*

Maya E-Group architectural assemblages have attracted scholarly attention for about a century, and yet our ideas about them have become more muddled through time. Since the beginning of investigations in the 1920s these structures have been thought to have had some astronomical function, but the exact astronomical significance suggested by archaeologists has changed through time. Today there is very little agreement about their meaning and function. In this presentation I will briefly review the history of the problem with an emphasis on the nature of the evidence that has been presented and how it has been presented. Rather than attempting to provide a definitive interpretation of the function of these buildings, I will argue that we have become increasingly, and perhaps dangerously, bold in our willingness to draw broad conclusions from limited evidence. The Maya E-Group problem sheds light on how interpretations become accepted as fact in archaeology, and the nature of scholarship in a fast-paced world.

Ainis, Amira F. (University of Oregon), René L. Vellanoweth (Department of Anthropology, California State University), Nicholas P. Jew (Department of Anthropology, University of Oregon), Antonio Porcayo Michelini (Instituto Nacional de Antropología e Historia [INAH]) and Andrea Guía-Ramírez (Instituto Nacional de Antropología e Historia [INAH])**[181]** *Investigating Prehistoric Fisheries: Growth-Band and Stable Isotope Analyses on Otoliths of a Critically Endangered Species (Totoaba macdonaldi) in the Upper Gulf of California, Mexico*

Over 700 fish otoliths were recovered during archaeological excavations at the Rancho Punta Estrella sites on the northern Gulf coast of the Baja Peninsula of Mexico; over 120 of these have been identified as totoaba (*Totoaba macdonaldi*, Sciaenidae), a critically endangered species due to

pressures from commercial fishing and human alterations of the Colorado River. AMS radiocarbon dates on seven totoaba otoliths suggest two primary occupations at ~4900–5400 cal BP and ~800–1150 cal BP. This study incorporates several analytical techniques for totoaba otoliths including: growth-band analysis, stable isotopes, and morphometric measurements; which are used to establish age and size estimates, and reconstruct local environmental conditions (SST). Oxygen ($\delta^{18}\text{O}$) and carbon ($\delta^{13}\text{C}$) isotope ratios have been used to generate inferences on the local habitats and life histories of totoaba, determine the season of capture, and investigate seasonal shifts in water temperature and salinity in the upper Gulf of California. Comparisons of archaeological and modern specimens revealed that pre-dam juveniles grew faster and matured earlier than post-dam totoaba. Our study contributes to the prehistoric record for this species, expanding our knowledge of indigenous fishing practices in the region and species-specific impacts related to the divergence of major waterways like the Colorado River.

Ainis, Amira F. [300] see Bender, Morgan

Ainsworth, Caitlin (University of New Mexico)

[368] *Late Spanish Colonial Subsistence Practices and Their Environmental Impact in the Middle Rio Grande Valley*
In 1598, Spanish colonialists introduced European domestic fauna, including sheep, pigs, and cattle, into New Mexico's Middle Rio Grande Valley (MRGV). Sometime after this initial contact, Native residents of the MRGV shifted away from the use of a diverse set of native fauna and focused their diets on non-native domestic taxa. This shift had far reaching effects; reliance on domestic grazers ultimately led to overgrazing, erosion, and loss of native species—all of which characterize the modern Southwestern landscape. Knowledge of the timing of these changes is critical to understanding their impetus and effects. Recent research suggests the shift from exploiting a diverse resource base to reliance on a small number of domesticates occurred after the end of the seventeenth century but before the beginning of the twentieth century. However, a lack of zooarchaeological data from sites occupied during the eighteenth and nineteenth centuries has thus far prevented more specific dating of this critical transition. Analysis of the faunal assemblage from Los Ranchos Plaza, occupied AD 1750–1904, is helping to fill this knowledge gap, and improve our understanding of changes in the nature of human and environmental interactions following the Columbian exchange.

Aitchison, Kenneth (Landward Research Ltd)

[122] *Discovering the Archaeologists of the Americas: Pilot Project*
SAA has developed a plan to investigate the demographics of the archaeological profession in the Americas, looking to bring together knowledge and advice on how the profession of archaeology (in Cultural Resource Management, academic, government, museum, self-employed, and other contexts) is structured throughout North, South, Central America, and the Caribbean. This proposed Discovering the Archaeologists of the Americas Initiative intends to conduct a series of linked surveys that will gather, analyze, interpret, and share information on archaeological employment and education across all of the countries of the Americas. This will set up a process by which the survey can be conducted periodically to examine the development of the profession over time. This will also allow direct comparisons to be made between archaeological employment in the Americas with Europe, where previous work has been undertaken, and potentially other areas of the world. SAA, together with Landward LLC, have begun to undertake the Pilot phase of that overall project, carrying out targeted research in two geographical areas—the Republic of Chile and the USA State of New Mexico. This will then inform SAA's decision-making process ahead of the potential implementation of the full, overall Discovering the Archaeologists of the Americas Initiative.

Aiuvlasit, Michael (Southern Methodist University)

[368] *Common Goods in Uncommon Times: Water, Droughts, and the Sustainability of Ancestral Puebloan Communities in the Jemez Mountains, New Mexico (AD 1100–1700)*

The Jemez and Pajarito Plateaus of the Jemez Mountains share similar cultural, environmental, and climatic contexts, yet large Ancestral Puebloan communities of the Pajarito abandoned mesa-tops for lowlands of the Rio Grande during the sixteenth century while occupations of the Jemez Plateau persisted until the seventeenth century. Droughts are hypothesized as a driver of depopulation of the Pajarito Plateau, but if so why wasn't the Jemez abandoned as well? Prehistoric communities built water storage features (reservoirs) at most large villages. These common pool resources serve as archaeological proxies for how communities took collective action to reduce the risk of water scarcity. Geoarchaeological investigations at 15 prehistoric water reservoir features at 9 sites across both regions, combined with geospatial analyses of hydrogeology and settlement histories allow the close evaluation of relationships between resource management, climate, and population dynamics. Communities of the Jemez Plateau used their reservoirs for the entire length of occupation. Reservoirs on the Pajarito Plateau stopped being used during droughts in the mid-1400s. Subtle differences in precipitation and geohydrology made Pajarito communities more vulnerable to droughts, but key differences in social organization likely played a greater role in the divergent trajectories of this region.

Aja, Adam [252] see Fu, Janling

Akmenkalns, Jessika (University of California, Santa Barbara)

[203] *Cultural Continuity and Change in the Wake of Ancient Nubian-Egyptian Interaction*

This paper addresses the effects of long-term contact and colonialism among ancient Egyptian and Nubian communities during the Kerma period (ca. 2500–1500 BC) in northern Sudan. A wide array of theoretical perspectives on culture contact and colonialism has emerged in recent decades, highlighting the diverse range of outcomes that can result from extended periods of interaction and struggles for political control. Such cross-cultural interactions may occur in the context of information exchange, trade networks, military conflict, and interpersonal relationships, precipitating an ever-changing social and cultural milieu. I investigate these conditions at the sites of Hannek and Abu Fatima, both Kerma period sites located in the hinterlands surrounding the Kerma political and economic center. The results of this study stem from excavations conducted in 2015 and 2016 and indicate that while the Kerman residents of Hannek and Abu Fatima incorporated a small selection of Egyptian objects and practices during the period of contact, the archaeological evidence suggests that these communities largely adhered to indigenous cultural traditions, even in the later part of the Kerma period when Egyptian colonialism was at its apex. This research stands to contribute to our understanding of how interaction shapes the negotiation of identities in borderland regions.

Akoshima, Kaoru (Tohoku University)

[42] *Toward Standardization of Lithic Use-Wear Identification in Conjunction with Technological Organization and Raw Material Variability*

The paper examines theoretical problems concerning characteristics of lithic microwear traces in the Paleolithic. Use-wear studies already experienced 40 years of research since the discovery of micro-polish varieties which reflect worked materials with wide applications to site structure analysis. However, global standardization of identification criteria still needs comparative efforts, especially on raw material variability and behavioral diversity among regional settlement and subsistence systems, hence experimental replication programs. The present research investigates comparative

framework of use-wear classification and interpretation for both “low-power” (microflaking) and “high-power” (micro-polish) methods, with special reference to the “technological organization” concept by Binford. Use-wear data is evaluated in terms of complex human mobility patterns over the landscape and technological dichotomy between “curated” and “expedient” components with raw material availability and distributions. Case studies are selected from the Upper Paleolithic of Northeastern Japan. The Mogami River project in Yamagata Prefecture by Tohoku University (1984 to 2016) including the Kamino A site, the Marumori 1 site, the Takakurayama site, the Hakusan E site, and the Hakusan B site, provides concrete data bases for discussion. Experimental framework by the Tohoku University team since 1976 is utilized for wear pattern standardization.

Alaica, Aleksa (University of Toronto)

[238] *The Health of the Herd: Considering Camelid Herding from Late Moche Peru*

The herding of camelids in the precolumbian past impacted daily and ritual life of peoples residing there. During the Late Moche period of Peru, camelid herding was a major factor in the trade and exchange of goods, people and ideas. The extent of herding and the degree of camelid breeding in the coastal desert has been understudied. This paper will discuss the patterns in camelid age profiles and pathologies to inform the extent to which camelids were traveling along the coast and into the highlands. The broad age profiles evident from detailed analysis displays a broad range of herds coming to the Late Moche site of Huaca Colorada (AD 650–850). These data indicate that the long-held view that breeding of camelids was localized to the highlands needs to be revised. The osteological evidence from Huaca Colorada reveals the biological constraints imposed on Moche communities residing here and the demands of localized breeding to account for the numerous juvenile camelid burials uncovered in mortuary contexts and those uncovered in feasting middens. In the end, the varied exchange from possible highland and coastal locations shows that individuals may have been coming from long distances to visit and engage with activities at Huaca Colorada.

Alaica, Aleksa [178] see Culquichicón-Venegas, María José

Albanese, John (University of Windsor)

[235] *Skeletal Evidence Suggesting Biological Continuity in the Ruling Lineage throughout the Late Helladic, Sub-Mycenaean, and into the Dark Ages on the Greek Island of Kefalonia*

The cluster of sites on Borzi Hill near the village of Tzannata on the island of Kefalonia includes several habitation areas and various tombs. The evidence suggests an extensive occupation during the Mycenaean (Late Helladic) Period, including the largest tholos or “beehive” tomb in the Ionian Islands. The tomb was built around 1350 BC at the same location as an older tomb that had collapsed. Although the tomb was looted in antiquity, excavations have yielded a number of notable finds including the remains of several dozen people. All the adult mandibles studied thus far in 2015 and 2016 that are not too damaged to be analyzed, fall into two very distinct patterns by sex. All the males, including the last individual buried in the tomb, have the same distinctive mandibular morphology. The last individual was interred in a distinct style that is not seen on the island until well into the Dark Ages, around the ninth century BC. If this morphology is inherited, the evidence suggests the royal lineage retained a prominent position in the community spanning various upheavals including the complete collapse and displacement of the Mycenaean civilization.

Albeck, María, Maria Amalia Zaburlin (Universidad de Jujuy, Argentina), Jose Luis Tolaba (Universidad de Jujuy, Argentina), Diego Martín Basso (CONICET—Universidad de Jujuy, Argentina) and Maria Elena Tejerina (Universidad de Jujuy, Argentina)

[222] *Far South: An Altiplanic Settlement in Northwestern Argentina*

Pueblo Viejo de Tucuté is the southernmost prehispanic (Late Intermediate Period) settlement with altiplanic roots so far recorded. It has nearly 600 dwellings installed in the mountain range southwest from Casabindo in the Puna de Jujuy, an altiplano like highland. The site is unique in the area, with particular architectonic features that differ from contemporaneous sites (Puna de Jujuy, Quebrada de Humahuaca, Valle Calchaquí). The houses are round, well built in cut stone with a diameter that ranges from 4 to 6 m. Several findings recovered during excavation resemble some from the Peruvian and Bolivian Altiplano, as described in colonial chronicles and ethnographic investigations although some characteristics are peculiar to the site. A brook clearly divides the settlement area in two, and in the middle rises a pucara presumably occupied only in times of conflict. 26 radiocarbon dates establish its occupation from the end of the tenth century to the first half of the fifteenth century. The early radiocarbon dating of the site outranges by a couple of centuries the moment proposed for the massive migrations of highland people in the Andes, due to climatic stress by drought during the twelfth and thirteenth century.

Albert, Rebecca (Michigan State University), Caitlin Clark (Michigan State University), Susan Kooiman (Michigan State University) and William Lovis (Michigan State University)

[21] *A-Maize-ing: Phytolith Evidence for an Early Introduction of Maize in the Upper Great Lakes Diet*

There is no recorded maize (*Zea mays* ssp. *mays*) at Laurel or North Bay Initial/Middle Woodland sites in the northern Lake Michigan-Huron or Superior basins of the western Great Lakes, despite the presence of maize microbotanicals in Michigan, New York, and Quebec as early as 400 BC. To evaluate the potential for an early maize presence in this region, samples of carbonized food residues adhering to sixteen ceramic vessels from the Laurel/North Bay Winter site (20DE17) were processed and analyzed. Low incidences of maize starches and phytoliths were present in multiple samples, three of which were dated to as early as the second century BC, 800 years before regional macrobotanical evidence. Compression damage to some starches as well as fine grit present in several samples support the proposition that the initial dispersal of maize in the region may have been through transmission of meal or flour, which was then incorporated into existing cooked dishes by local populations. The lack of maize macrobotanicals for centuries thereafter suggests that maize did not immediately become a significant component of regional cuisine until long after its initial introduction to the Upper Great Lakes.

Alberti, Benjamin (Framingham State University)

[65] *Moderator*

Albrecht, Conrad [118] see Pezzutti, Florencia

Alcaina Mateos, Jonas [274] see Lancelotti, Carla

Alcantara, Keitlyn (Vanderbilt University Department of Anthropology)

[215] *“Eating Locally” in Tlaxcallan: The Impacts of Political Economy on Postclassic Diets*

Late Postclassic Central Mexico is defined by significant political change, with the Aztec Triple Alliance quickly dominating the political landscape. As the triple alliance materialized in the fifteenth century, Tlaxcallan simultaneously emerged as a key market center, connecting trade in the central highlands to the Gulf Coast. As the alliance expanded, Tlaxcallan remained a uniquely unconquered space, yet the conditions of its autonomy are unclear. Siege of trade routes and the manipulation of access to commodities (often foods key to diversifying local diets) was a central tactic used by the Triple Alliance. Through bioarchaeological analysis of dietary isotopes, which reflect consumed foods incorporated into human bones and teeth, I discuss preliminary results from burials excavated in the city of Tlaxcallan's Tepeticpac district. Changes in local diets could disclose nuanced social and political relationships of market administration and economic embeddedness, and clarify the political and economic position of Tlaxcallan during this period. Differential access to foods likely also occurred at a subgroup level (age, sex, occupation, or social group). This information can be used to reconstruct social structures within Tlaxcallan, and their relationship to broader geopolitical networks of trade in order to contextualize how local political architects confronted interregional politics.

Alcántara Salinas, Andrés Saul

[183] *El caso de la Parcela 28 del Ejido de Comala, Colima: La problemática del saqueo arqueológico y recuperación de una tumba de tiro*
El denominado Occidente Mesoamericano, presentaba características únicas que lo diferenciaban del resto de las culturas de esta súper área cultural; diferencias que son claramente observables en el sistema funerario que fue utilizado por estos grupos, al cual se le denominó como: "Tradición de Tumbas de Tiro." El legado patrimonial que dejaron estos grupos se encuentra en prácticamente todo el territorio del estado de Colima, desafortunadamente este se ha visto alterado por la práctica que realizan muchos pobladores y son quienes generan el saqueo de contextos con la intención de obtener las piezas cerámicas, artefactos de piedra entre otros muchos objetos depositados al interior de las cámaras funerarias. La destrucción y pérdida de muchas tumbas ha sido una constante a lo largo de poco más de 80 años. Uno de los trabajos que realiza el INAH, es el de atención a denuncias, con los cuales le permite la intervención de áreas o sitios que están siendo alterados por el saqueo; con estos trabajos se llega a recuperar objetos diversos e información novedosa e importante, que juntos enriquecen el acervo patrimonial arqueológico de México.

Alcántara Salinas, Andrés Saúl [183] see Ortega, Allan

Alcock, Susan (University of Michigan)

[70] *Discussant*

Alconini, Sonia (University of Texas At San Antonio)

[231] *Fertility, Water, and Rock Art on the Inka Imperial Fringes: The Valley of Mariana and Samaipata*
Samaipata was one of the largest centers of the Southeastern Inka frontier. Multifunctional in nature, it was an important advance point toward the tropical lowlands. Despite the intrusions of the Guaraní-Chiriguano, this region witnessed complex processes of settlement reorganization. This was particularly the case of the fertile valley of Mairana, an important breadbasket of this frontier outpost. Occupied by the Mojocoya and Gray Ware archaeological cultures, their inhabitants produced complex rock artistry and participated in vibrant interregional exchange networks. Based on a recent survey, this poster explores the occupational dynamics of this valley, and its later incorporation into the Inka imperial economy. It also discusses the importance of rock art in indigenous ritual practices associated with water and fertility.

Alcover Firpi, Omar A. (Brown University), Charles Golden (Brandeis University) and Andrew Scherer (Brown University)

[118] *Reconsidering "Sites," "Features," and "Landscapes" in the Maya Lowlands with Remote Sensing and Ground-Based Survey*
Etic distinctions between "sites" and "landscape features" and the limits of pedestrian survey have long influenced how scholars in the Maya lowlands model social and political dynamics of the region. The adoption of remote sensing technologies, particularly lidar, has improved our ability to identify anthropogenic features over wider areas. Yet remote sensing data collection remains centered on known "sites" and data serving to further expand the mapped boundaries of ancient "cities," generally without challenging the notion of bounded settlements. Too often, research tends to emphasize a synchronic view of "sites," whose edges are often defined not by emic understandings of boundaries but by the limits of archaeological survey. Moreover, the palimpsest of cultural features, including walls, terraces, and dams dispersed on the landscape reveal a complicated history of construction and use. We suggest that only if we revise theoretical conceptions of the relationship between 'site,' 'feature,' and 'landscape' can these technologies be better used to answer new questions concerning landscape adaptation. This paper draws on recently acquired remotely sensed data and over a decade of ground-based survey data from the Usumacinta River valley of Mexico and Guatemala to offer new interpretations of landscape use and change among the Maya.

Alcover Firpi, Omar A. [131] see Garrison, Thomas

Aldenderfer, Mark (University of California) and Leslie Aiello (Wenner-Gren Foundation)

[70] *Wenner-Gren Foundation Funding for Archaeology*

Over the past 15 years the Wenner-Gren Foundation has received approximately 3,000 applications for research funding from archaeologists (students and established scholars) and have funded just under 500 of these requests (success rate = 15–16%; grand total of funds awarded = \$8,050,000). The Foundation does not fundraise and thus the amount we can award each year is dependent on the financial markets. A particular challenge is to maintain and grow the spending power of the endowment, while continuing to fund as many worthy projects as possible. Although we are not dependent on the vagaries of donors or government policies, it is not an easy investment task to achieve the necessary level of return to meet the current requirements of the field let alone funding needs that may arise as priorities of government agencies and philanthropic sources change.

Aldenderfer, Mark [286] see Haas, Randy

Alders, Wolfgang (University of California, Berkeley) and Abdallah Khamis Ali (Department of Museums and Antiquities, Zanzibar)

[307] *Preliminary Results of Geoarchaeological Sampling and Survey to Investigate Landscape History in Northern Unguja, Zanzibar*
We present the preliminary results of a study investigating long-term agricultural history in northern Unguja, the southern island of Zanzibar. In the summer of 2016, we excavated four test pits in modern rice fields to collect bulk, starch, phytolith, C14, and micromorphology samples, as well as samples from upland areas along watersheds, with the aim of characterizing contemporary and ancient land use in the rice-growing western side of the island. We also carried out brief archaeological surveys along three different watersheds, in the western, northern, and eastern parts of the island. Preliminary results suggest diverse strategies for agricultural production that varied in relation to urban development at Tumbatu and Mkokotoni in the

northwest, Zanzibar Stonetown in the southwest, and settlement on the northeastern side of the island. Productive diversity existed both between and within the two broad ecological zones in northern Unguja: the deep, clayey soils in the west where rice farming is possible, and the bare, rocky bedrock outcrops in the east where marginal banana, coconut and cassava farming exists through landscape modifications in the coral stone. We reflect on the implications of these differences for understanding long-term landscape histories in island East Africa.

Alderson, Helen (University of Cambridge)

[374] *Women Weaving Individual and Collective Identities in Kosrae, Micronesia (1824–1924)*

In Oceania, archaeologists have examined perishable ethnographic items to gain fresh insights into past people's identities. This paper presents a new analysis of nineteenth- and twentieth-century Micronesian loincloths from European and American museums, explaining how their construction offers insights into islanders' sociopolitical identities during a period of rapidly intensifying global interconnectivity. On the island Kosrae, Micronesia, tol (loincloths) were the primary garment of every polity member. Women wove tol on looms, using specific motifs to create identifiable styles. The German Southseas Expedition (1908–1910) recorded that each style materialized an individual social status, such as fisherperson or chief. I propose that in weaving tol, women also created collective social identities, such a gendered sense of self as traditional knowledge holders. While tol were indisputably Kosraean, their history is connected to a broader Micronesian weaving tradition. Tol motifs were not only passed from Kosraean mothers to daughters, but were also passed between interacting populations. This sharing accelerated after European contact (1824). In order to quantify this change, I present statistical analyses of motif transferal over time in tol, illustrating how Kosraean women used insider and outsider motifs to maintain old identities, and construct entirely new ones, in an increasingly cosmopolitan world.

Alegria, Crystal (Project Archaeology) and Jeanne Moe (Project Archaeology BLM)

[97] *Descendant Communities and Curriculum Development: Working Toward a Culturally Relevant Development Process*

Archaeological excavations at the Absaroka Agency, a Crow Indian Agency located near present-day Absaroka, Montana, provided an opportunity to develop educational materials using authentic archaeological data. Staff from Project Archaeology, a national archaeology education program, designed and developed curriculum materials for upper elementary students using the archaeological evidence from the excavations at the agency site. These materials use archaeology to teach students historical and scientific inquiry with authentic archaeological data. Crow tribal members, educators, and archaeologists collaborated to develop the educational materials with Crow community members providing the enduring understandings, or main concepts, for the materials. As this project is coming to a close, we will present our assessment and overview of this seven year project including our collaborative process, research design, and our consultation with the Crow Tribe.

Alex, Bridget [338] see Caracuta, Valentina

Alfonso-Durruty, Marta [231] see Morello Repetto, Flavia

Alix, Claire (CNRS UMR8096/Univ. Paris 1 Pantheon Sorbonne), Owen Mason (INSTAAR, University of Colorado) and Lauren Norman (Dept. of Anthropology University of Kansas)

[144] *"Untangling the timbers": New Perspectives on Birnirk Architecture in Northwestern Alaska*

Birnirk culture is well-known for driftwood structures that were repeatedly reassembled to form low mounds. The structures were "hopeless tangle[s] of logs" to pioneering 1930s archaeologists whose reports lack details on construction techniques. Birnirk houses diverge from the preceding Old Bering Sea and later Thule single room houses with lengthy entrance tunnels. Our 2016 fieldwork "followed the wood," employing enhanced photography within two exceptionally preserved houses at Cape Espenberg, to infer Birnirk architectural strategies and used diagnostic assemblages to refine cultural filiations by comparison to Siberian Birnirk, and the transition to Thule through a high-resolution, tree-ring and 14C, chronology.

Alix, Claire [144] see Norman, Lauren

Allard, Amelie (University of Minnesota)

[128] *"Little Hope of Much Trade This Year": Merchant Capitalism and Community-making in the Late Eighteenth-Century Western Great Lakes Fur Trade*

While the North American Fur Trade has often been examined through economic lenses, scholarship from the 1980s onward has striven to demonstrate that this colonial phenomenon was more than mere trade and merchant capitalism: it also embodied a complex web of social relationships and practices that went beyond daily transactions. In this paper, I unpack the ways in which exchanges, of myriad shapes and forms, between Euro-Canadian fur traders and local Indigenous groups in the Western Great Lakes intersected socially and physically with other daily practices such as food procurement and mobility. Drawing from my research on the late eighteenth-century fur trade landscape of Minnesota and Wisconsin, I bring to light some of the ways in which Anishinaabeg and Dakota peoples (the two most powerful social formations of this area at the time) not only dictated the terms of their participation through trade and politics, but also controlled the movement of fur traders on their hunting grounds through a choice to share knowledge—or not. Lastly, I address the issue of accessing knowledge of Indigenous perceptions of this process through archaeological research, especially given the common mislabeling of post-Columbian Indigenous occupations as "fur trade posts" based on artifact assemblages.

Allard, Francis (Indiana University of Pennsylvania)

[333] *The Maritime Silk Route and Southeast China during the Han Dynasty: A View from Panyu, Hepu, and Lingnan's Hinterland*

Consisting of the present-day provinces of Guangxi and Guangdong, the Lingnan region was from early on impacted by political and cultural forces centered to its north. Following Lingnan's brief occupation by the Qin (214–204 BCE), the Qin general Zhao Tuo established the independent kingdom of Nanyue, whose defeat at the hands of Han armies in 111 BCE resulted in the region's formal incorporation into the Han Empire. Importantly, various lines of evidence dating to the Han dynasty point to Lingnan's increasingly extensive contacts with regions located further south along the so-called maritime silk route. Such evidence includes texts (indicating Lingnan's likely interaction with the Indian subcontinent), grave goods (e.g., elephant tusks, frankincense, beads made of precious stones), nonlocal knowledge (e.g., granulation), and architectural elements (e.g., stone columns). Many of these 'southern' (or 'western') elements are well represented at Panyu (the Nanyue kingdom's capital) and Hepu (a post-Nanyue kingdom coastal port), leading some archaeologists to emphasize the importance which such contacts played in Lingnan's development during the Han dynasty. However, a closer look at these foreign elements' spatial and sociopolitical patterning throughout Lingnan points instead to the likely limited impact which the Southern Maritime Route played in such developments.

Allcock, Samantha [274] see Jenkins, Emma

Allen, Kathleen M. S. [52] see Schreiner, Nina

Allen, Mitch (Mills College) and William B. Trousdale (Smithsonian Institution [retired])

[297] *Resuscitating an Archaeology Project: The Helmand-Sistan Project in Afghanistan, 1971–1977*

The Helmand-Sistan Project, conducted jointly by American and Afghan archaeologists, was the first prolonged systematic survey and excavation of the lower Helmand River region of southwest Afghanistan. It identified over 200 sites dating from the third millennium BCE to the fifteenth century CE and conducted excavations at a dozen of them. Military action abruptly halted the project, caused the demise of its collection of material culture stored in Afghanistan, and limited publication to a few focused articles on specific sites and finds. After 40 years, we are now attempting to resuscitate the project and bring it to final publication, increasingly important because of the unlikelihood of further archaeological work in this area in the future. The challenges of doing so without the ability to recheck site details on the ground, without artifacts available for further analysis, and with project members scattered or deceased, will be the topic of this presentation. The paper will also highlight some key findings of the Project, notably in the canal-fed Sar-o-Tar region east of the Helmand River, intensively occupied and farmed only sporadically because of changing climatological and hydrological conditions.

Allen, Susan (University of Cincinnati)

[27] *Halaf Seasonality and Mobility: An Archaeobotanical View from Fistikli Höyük, Turkey*

Settlement patterns and mobility during the Halaf period (ca. 6000–5400 BC) are known primarily from Late Halaf sites. On the basis of the Late Halaf pattern, Halaf economies have been characterized as having segmentary organization with some degree of pastoral specialization reflecting a broad pattern of long-term mobility. However, the paucity of floral and faunal studies, particularly for the Early Halaf, limits the visibility of economic variability over the course of the Halaf. In this regard, archaeobotanical data from the Early and Middle Halaf site Fistikli Höyük (ca. 6000–5700 cal B.C.), located in southeastern Turkey on the eastern edge of the Euphrates floodplain, facilitates more nuanced reconstructions of Halaf mobility patterns that highlight their temporal and spatial variation. At Fistikli, the relative lack of weed seeds in midden and surface samples, together with the high frequency of cereal chaff and high proportion of dendritic long-cell phytoliths in many surface samples point toward the regularity of cereal threshing on-site and the use of threshing by-products as fodder for sheep and goats. The use of both dung and wood fuel in separate burning installations may indicate repeated short-term occupation at different times of the year.

[388] *Discussant*

Allison, James (Brigham Young University)

[129] *Kinship and the Self-Organization of Exchange in Small-Scale Societies*

Circulation of material goods is common in small-scale societies. Even where exchange is not coordinated above the level of the household, goods produced in one area are consistently conveyed to distant settlements. Numerous ethnographic studies demonstrate that exchange transactions are common among kin, and that the circulation of goods in small-scale societies is structured by kinship ties. From an individual's point of view, the number of kinfolk available to exchange with and where they live strongly affect access to nonlocal goods. This paper explores the interrelationships among kin networks, settlement organization, and exchange using agent-based modeling, ethnographic studies, and archaeological data.

Allshouse, Aurora [389] see Zwyns, Nicolas

Alonzi, Elise [8] see Pacheco-Fores, Sofia

Alsgaard, Asia (University of New Mexico)

[7] *The Utility of Nestedness in Zooarchaeological Assemblages: A Study from the Northern Maya Lowlands*

Nestedness analysis suggests that the presence of specific ichthyofauna in assemblages from seven different sites from the northern Yucatán peninsula may be a result of the life-histories of those species or cultural preferences rather than being driven by environmental barriers. The results suggest that the assemblages may be derived from different populations suggesting that they are not coming from the same source. I argue that while trade is playing a role, it is also likely that ancient fishermen were obtaining fish from the surrounding environment nearest to the archaeological site. Thus, the variation in fish species between sites is a result of differential selection of fish based on their availability as constricted by their life-histories or by cultural preferences rather than environmental barriers. The local nature of ichthyofauna within zooarchaeological assemblages has been previously argued for the site of Xcambó and I suggest that this can be extended to more of the sites covered by the analysis. Only an expanded dataset at more sites will be able to provide insight into the breadth of this potential pattern; however, nestedness analysis provides the initial data for the potential in connecting fish species to local site habitats.

Alsherif, Ahmed (Sebha University, Libya)

[375] *The Cultural and Historical Connection between Tefinagh Inscriptions and Rock Art Sites in Tadrart Acacus (Southwest Libya)*

This paper discusses what kind of cultural and historical correlation between Tefinagh inscriptions and rock art in the Tadrart Acacus. The Tuareg alphabet, Tefinagh, is one of ancient African alphabets documented not only in Libya but also Algeria and Tunisia, among other countries. It is traditionally taught by a mother to all her children. This alphabet, which dates back at least to the second half of the first millennium BCE, is used by approximately 50% of the Tuareg for short messages and inscriptions. Furthermore, hundreds of Tefinagh inscriptions have been discovered in the Tadrart Acacus, some placed near or at sites with rock art. The rock art sites in the Tadrart Acacus dated from 12000 BCE to 100 CE. The study area, Tadrart Acacus, is an area of about 150 km in length and 50 km in width. It is located in the Fezzan region situated in southwest part of Libya. Tadrart Acacus hosts one of the richest concentrations of Saharan rock art and was included on the UNESCO list of World Heritage Sites in 1985. This paper attempts to undertake interviews with Tuareg people as per the questionnaire provided, and also uses standard recording sheets.

Al-Suliman, Amer [121] see Cordova, Carlos

Alt, Susan M. (Indiana University Bloomington)

[209] *Weaving Meaning into Mississippian Ritual*

Fabric is rarely recovered from Mississippian sites, although there have been a few spectacular finds. There are however other lines of evidence that speak to the use and meaning of fabric in the Mississippian world. We have recovered the charred remains, or at times structured ash of what were once bags, mats, baskets or other fabric items during excavations at a few Cahokia related sites in the American Bottom region of Illinois. The Emerald Shrine Center in particular has produced these "ghostings" of fabric, particularly in buildings that were once shrines. The repeated burning fabric as part of the decommissioning of the shrines is striking at Emerald, as are the great numbers of spindle whorls that have been found at villages located near the shrine center. Weaving together meaningful interpretations of these fabric remains and spinning tools is possible by considering Mississippian art, ethno-historic accounts and by contrasting what is known of other Mississippian fabrics. My interpretations will be plaited together with considerations of nonhuman actors and the enchainment of powers and forces that adhere to the material world and the raw materials of fabric construction.

Alt, Susan M. [283] see Barzilai, Rebecca

Altman, Heidi (Georgia Southern University) and Tanya Peres (Florida State University)

[385] *Brother Bear: The Role of Ursus americanus in Cherokee Society*

Archaeological sites in the Southeastern United States often contain remains of the black bear (*Ursus americanus*), which, upon excavation, are placed into one of two general categories for further analysis: food or modified. The confines of these categories precondition interpretations of the bear remains, and limit possible crucial understanding of the roles of bears in the social life of the people who interacted with them. While the category of "food" can be further divided into quotidian or communal (feast) meals, the "modified" category is most frequently interpreted as "ceremonial" and left at that. Our paper, which is part of a larger series of papers, is a study in the ethnozoarchaeology of bears. We examine bears in the archaeological record from the pre-European Contact through Historic periods among peoples who lived in the region of the traditional Cherokee homeland. We compile archaeological data and combine their interpretations with information from ethnographic, ethnohistoric, and linguistic sources to offer a more robust construction of human-bear relationships, and their constancy through time into the present. By expanding the contexts through which bear remains are interpreted we offer new models for understanding the complex relationships between people and the animals whose world they share.

Altschul, Jeffrey [113] see Ciolek-Torello, Richard

Alvarado, Carlos [182] see Demarest, Arthur

Alvarado, Claudia I. (Universidad Nacional Autónoma de México)

[217] *The Palace Group at Xochicalco, Morelos, Mexico*

Xochicalco is a hilltop site located in the mountain range of the western part of the modern Mexican state of Morelos. Archaeological investigations carried out in the upper part of the site between 1994 and 2009 have provided several breakthroughs in our understanding of one of the most representative sites of the Epiclassic period in Mesoamerica. The site's major building complex, known as the Acropolis, is situated on the very top of the hill. Covering approximately a hectare, this group comprises ten structures interconnected by corridors and stairways. Excavations in this sector have provided multiple lines of evidence that have enabled us to identify this built space as a palace. Therefore, considering the location of the Acropolis, its architectural features, its dimensions, the recovered objects, and the evidence for a major destruction event, this paper will explain the configuration of this palace, as well as its implications and repercussions in the social space of Xochicalco.

Alvarez, Socorro, María Jesús Novelo Pérez (Universidad Autónoma de Yucatán) and Lilia Fernandez Souza (Universidad Autónoma de Yucatán)

[349] *Estudio petrográfico de la cerámica de Sihó, Yucatán, durante el Clásico Tardío y Terminal*

Sihó, sitio arqueológico localizado en el occidente de Yucatán, fue ocupado en distintos momentos de los periodos Preclásico y Clásico, aunque su ocupación más importante ocurrió durante el Clásico Tardío y Terminal. Es a este momento que corresponden gran parte de los edificios monumentales del asentamiento. La Universidad de Yucatán ha desarrollado en este sitio excavaciones que han permitido la recuperación de cerámica de diversos estratos socioeconómicos, tanto en contextos tipo elitario como en conjuntos de mediano y bajo status de los periodos Clásico Tardío y Terminal. El propósito de esta ponencia es presentar el análisis de petrografía enfocado en la textura de grano fino con el fin de obtener información de rasgos texturales que ayuden a identificar alteraciones de la arcilla para determinar parámetros de cocción en los artefactos culturales. Con base en lo anterior, discutiremos tanto los patrones de consumo y tecnología cerámica del sitio en un marco regional así como determinaremos las variaciones observables en los distintos contextos analizados enfatizando aquellas relacionadas con la forma de las piezas y su distribución en los conjuntos habitacionales del sitio.

Amador, Fabio Esteban [386] see Rissolo, Dominique

Amador, Julio (UNAM)

[175] *Landscape, Settlement Patterns and Rain and Fertility Symbolism in Rock Art: A Comparative Analysis between Chalcatzingo and Cerros De Trincheras in Mexico*

In this paper we present a systematic comparative analysis of the most characteristic cultural traits of sites, apparently distant in time and space, that share fundamental aspects, concerning basic geomorphological and landscape features, settlement patterns, and rain and fertility symbolism depicted in rock art. The direct association between political power and religious authority, social prestige and the privilege of presiding ritual performances appears to be evident. While in Mesoamerica this historical and cultural processes took place from about 1500 BC. In northwestern Mexico they began to occur around AD 800. Nonetheless, as we will try to show, similarities are surprising.

Amano, Tetsuya [144] see Fitzhugh, Ben

Amaral, Adela (UC Berkeley)

[64] *Discussant*

Amartuvshin, Ch. [113] see Ciolek-Torello, Richard

Ambrose, Stanley (U. Illinois, Urbana-Champaign) and Jibril Hirbo (Vanderbilt University Medical Center)**[287]** *African Ancestry or Neanderthal-Human Genetic Admixture in Eurasians? African Diversity Matters*

Neanderthal and Denisovan genetic admixture with Eurasian modern humans, and a “signature” of Neanderthal admixture in African populations, are widely accepted “facts.” Inferences of admixture are based mainly on the assumption that Yoruba, San and/or Pygmy populations contain all African genetic variation. Variants shared among Neanderthals and modern Eurasians, but not present in these Africans, are assumed to reflect 2–4% admixture. However, genetic diversity and geographic structure are greater in Africa than Eurasia, so small samples are inadequate. Non-African ancestry lies in northern and eastern Africa. Therefore, excluding northeast African genomes automatically identifies them as “admixed” rather than as descendants of the common ancestors of Eurasians and northern/eastern Africans. For example, the Maasai of Kenya appear to have 1–3% Neanderthal admixture. How much would inferred archaic admixture with Eurasians be reduced by including Eastern and Northern Africans in admixture analyses? Adding Dinka from South Sudan to Yoruba and Pygmy datasets reduces Neanderthal admixture in modern French genomes from 2% to 1.3%. Conversely, using only Yoruba or Pygmy genomes increases estimates of Neanderthal admixture in Eurasians. Admixture should be considered unproven until more populations are used to ascertain African genomic diversity, and the alternative hypothesis of common ancestry is evaluated.

Ambrose, Stanley [154] see Goldstein, Steven

Ameen, Carly, Ardern Hulme-Beaman (University of Liverpool), Allowen Evin (University of Montpellier), Greger Larson (Oxford University) and Keith Dobney (University of Liverpool)**[85]** *What Big Teeth They Have: Rethinking Mandibular Tooth Crowding in Domestic Dogs and Wolves Using Landmark-Based Metric Analysis*

Tooth crowding is one of several criteria used for the identification of domestic animals in archaeological contexts, and is used frequently in dog domestication studies to support claims of early Paleolithic domesticates. Studies of crowding have varied in their quantitative approaches, and can be improved by more robust statistical testing and the incorporation of more specimens with secure wild or domestic identifications. Here we present a landmark-based method for analyzing tooth crowding, along with a statistical framework for describing crowding between populations. Our method expands on traditional metrics used to quantify crowding and is applied to a large dataset of modern dogs, modern wolves, and Late Pleistocene wolves to examine the prevalence of tooth crowding in these populations. Results show that both modern and Pleistocene wolf specimens exhibit more mandibular crowding than domestic dogs. This contradicts generally accepted assumptions regarding the nature of tooth crowding in dogs, and domestication in general, though future studies should specifically target archaeological material to investigate crowding within distinct archaeological populations. This shows that landmark-based methods offer powerful tools for recording and analyzing tooth crowding, and that assumptions surrounding tooth crowding in the identification of archaeological canids and other mammals should be critically reexamined.

Ameen, Carly [127] see Britton, Kate

Ames, Christopher (University of Victoria)**[121]** *A Multi-Proxy Site Formation Analysis of a Late Middle Pleistocene Occupation in the Azraq Wetlands of Northeastern Jordan*

The Azraq Marshes Archaeological and Paleoecological Project (AMAPP) aims to understand and evaluate the importance of the Azraq wetlands for Pleistocene hominin populations. Ongoing research since 2009 indicates that the northern wetland, the Druze Marsh, acted as a desert refugium for hominins throughout the Middle and Late Pleistocene. Excavations in the southern marsh—known as the Shishan Marsh—began in 2013 and uncovered a rich assemblage of bifaces, small tools, and flakes, along with fragmentary faunal remains. The Shishan Marsh 1 (SM1) occupation, which dates to approximately 250 ka, is embedded in a complex sedimentary sequence indicative of a transitional environment, from a lake to marshy ponds that formed at the edge of an alluvial fan. This paper summarizes the results of sedimentary and microbotanical analyses of the site's stratigraphy, as well as site formation indicators from the lithic and faunal remains recovered during the 2013, 2014, and 2015 field seasons. We conclude with a discussion of the depositional history of the Shishan Marsh occupation, and implications for deciphering how the area was used by the late Middle Pleistocene inhabitants.

Ames, Kenneth M. (Portland State University) and Andrew Martindale (University of British Columbia)**[176]** *An Archaeological Test of a Settlement Pattern Shift Recorded in Tsimshian Oral Records*

We archaeologically test a hypothesis derived from the Tsimshian oral record. That record recites a long history of settlement movement and conflict culminating in an invasion of coastal Tsimshian territory by northerners. This conflict reportedly caused the Tsimshian to temporarily abandon their coastal territories and retreat inland. We tracked settlement shifts through a site taxonomy and intensive analysis of a large 14C sample acquired by percussion coring. We found an occupational hiatus in the study area and hence cannot disprove the hypothesis. We conclude the archaeological data are best explained by the history described in the indigenous oral record.

Ames, Kenneth M. [51] see Kopperl, Robert

Ames, Nicholas (University of Notre Dame) and Meagan Conway (University of South Carolina)**[207]** *Island, Mainland, and the Space Between: The Role of Geography in Shaping Community Historical Trajectories of Nineteenth- and Twentieth-Century Ireland*

This study looks at the relationship between geographical “islandness” and community formation in Western Ireland. In this paper we investigate to what degree geography shapes the social, economic and political experiences of a community. Furthermore, we examine to what extent these elements of community composition strengthen or diminish their influence on each other. We compare the nineteenth- and twentieth-century island communities of Inishbofin and Inishark, Co. Galway against the complementary mainland townlands of Streamstown, Co. Galway and the Killary, Co. Mayo. This paper traces the extent to which social dynamics (community constitution and development through time), degree of political engagement (local implementation of regional and national policy), and economic opportunity (types of local industry and extent of trade network) impact development on island communities in relation to these mainland counterparts. Using historical documents, archaeological excavation and survey data, as well as digital mapping, this comparative study shows how communities of similar historical composition, but with varying geographic situations, can result in different social, political, and economic mentalities which ultimately shaped the experience and development of the present day island and mainland communities.

Amundson, Leslie J., Kevin Grover (Stantec Consulting Ltd.), Margaret Kennedy (University of Saskatchewan), Brian Reeves (University of Calgary) and Grant Wiseman (Stantec Consulting Ltd.)

[336] *Multispectral Photogrammetry of Cultural Landscapes on the Northern Plains from Unmanned Aerial Vehicle Platforms*

As early adopters of technology, especially for creating accurate maps, archaeologists have been using Unmanned Aerial Vehicles (UAVs) to discover and record archaeological features, landscapes and excavations since they became commercially available. This project tested the use of visual (RGB), near-infrared (NIR) and thermal sensors mounted on UAV platforms (fixed wing and multi-rotor) to discover and record archaeological features in their landscape context with georeferenced, high resolution imagery of two landscapes on the Northern Plains that contain a variety of cultural features, including stones circles, boulder alignments, stone cairns and medicine wheels. We created digital layers to compare with the results of conventional archaeological survey, in cooperation with an ongoing archaeological survey in the vicinity of the forks of the South Saskatchewan and Red Deer Rivers in southwestern Saskatchewan. We applied both Object Based Image Analysis (OBIA) and desktop visual examination of the imagery captured in this project in order to determine whether interpretation results were similar to conventional survey and whether conventional survey and UAV-based multispectral imagery recognized different features.

[336] *Chair*

Anaya Hernández, Armando (Universidad Autonoma De Campeche)

[337] *Preclassic Complexity in the Central Karstic Uplands: Yaxnohcah and its Neighbors*

The Preclassic (900 BCE—150 CE) was the period during which the earliest sedentary communities in the Maya lowlands were founded. Acts that initiated these early civic charters, such as the construction of E-Groups and communal platforms, were followed quickly by rapid expansion of communities throughout the landscape, involving population growth, monumental architecture, massive waterworks, and a high degree of sociopolitical complexity. It was also during this period when ideologies and practices in religion, statecraft, and commerce were firmly established. In this context archaeological research has been shifting its attention to the Preclassic in order to address the still impervious questions on how this growing complexity led to the advent of Maya culture. Recent archaeological excavations at Yaxnohcah and other Preclassic sites have centered on those topics that endeavor to shed some light on this complex process. In this paper we will present a review of such efforts at Yaxnohcah and situate them in relationship to the development of complexity in the Central Karstic Uplands. We focus on the adaptation of the earliest settlers to the wetland landscape during the Middle Preclassic and the subsequent early appearance of low density polycentric cities in the region.

[337] *Chair*

Anaya Hernández, Armando [337] see Carr, Christopher

Anaya Hernández, Armando [337] see Reese-Taylor, Kathryn

Anderson, David (University of Tennessee), David Echeverry (University of Tennessee), D. Shane Miller (Mississippi State University) and Stephen Yerka (University of Tennessee)

[227] *PIDBA (Paleoindian Database of the Americas): Long-Term Collaborative Research at International Scales*

Compiling and making accessible primary archaeological data from multiple sources and across large areas is one of the grand challenges facing archaeology in the twenty-first century. The Paleoindian Database of the Americas (PIDBA) has been operating for over 25 years to make Paleoindian data openly accessible online to all interested parties. Data from more than 100 scholars, including locational data on over 30,000 projectile points, has been made available in digital form that has been variously used for analyses and display. PIDBA serves as a model for collaborative interaction between professional and avocational archaeological communities across the Americas. Analytical challenges include rendering data from disparate sources interoperable, assuring the security of sensitive data, and maintaining networks of researchers providing information. PIDBA is now linked with DINAA, making the information within it even more widely accessible, and hopefully it, or a data source something like it, will continue to exist long into the future.

[256] *Discussant*

Anderson, David S. (Roanoke College)

[212] *Esoteric Spiritualities and Archaeology: Bridging Alternative Understandings of the Ancient World*

Practitioners of esoteric religious traditions express profound interest in the ancient world as a source of wisdom. Yet the view of the ancient world forwarded by these groups is often one that archaeologists struggle to understand. It is a worldview that blends perceived ancient traditions from a variety of cultures into a new milieu that results in practices such as Kemetic Yoga and beliefs in Atlantis as a spiritual home for all humanity. This paper will focus on a case study of the beliefs, practices, and history of the Theosophical Society founded by Helena Blavatsky. The ways in which this esoteric spiritual group embrace notions of the ancient world reveal opportunities for archaeologists interested in promoting heritage preservation. I will argue that archaeologists can in particular use notions of shared global heritage to advocate for archaeological preservation among esoteric audiences.

[212] *Chair*

Anderson, E. (UC Riverside) and Chelsey Gerald Armstrong (Simon Fraser University)

[172] *Archaeologies of the Heart*

This paper raises two questions: How do you investigate environmental ethics and emotions in the archaeological record, and how do we now use archaeological evidence to work with Indigenous and local people on heritage and conservation? We discuss the role of emotion in archaeology, with specific reference to cooperation between archaeologists and First Nations people in preserving heritage sites in British Columbia.

Anderson, J. Heath (Minnesota State University)

[120] *Discussant*

[120] *Chair*

Anderson, Shelby (Portland State University), Thomas Brown (University of British Columbia), Justin Junge (Portland State University) and Jonathan Duels (University of British Columbia)

[257] *Exploring the Development and Spread of Arctic Maritime Traditions through Bayesian Radiocarbon Analysis*

To address the question of why arctic maritime traditions developed and spread in the North American Arctic during the mid- to late Holocene, we applied Bayesian analysis to a large radiocarbon database ($n = 1202$) for northwest Alaska and the Bering Strait region. We used Oxcal to create and analyze demographic patterns in summed probability distributions. We also used Bayesian calibration models to clarify the probable timings and

durations of cultural phases and key transitions in the development of arctic maritime adaptations. Our analysis indicates that northern Alaskan populations grew significantly over the last 4,500 years. Population growth was punctuated by at least two periods of population decline beginning around 1000 cal BP and again around 550 cal BP. Significant population growth in the western Arctic predates the intensification of marine resource procurement by at least 1,200 years, suggesting that population growth was a possible driver for increased reliance on marine resources. This analysis establishes a strong chronological framework for future study of the development and spread of maritime adaptations in the Arctic and beyond. Anderson, Shelby [47] see Jolivet, Stephanie

Andersson Strand, Eva (SAXO institute, University of Copenhagen)
[209] *Discussant*

Andrea Cabello, Gloria [134] see Pestle, William

Andrews, Brian (Rogers State University) and Brooke Morgan (State Historical Society of North Dakota)
[332] *Open-Air Site Formation in Low Deposition Environments*

Studies of intra-camp spatial organization and activity area patterning in open-air camps often result in significant insights into forager behavior and social organization, but the complex spatial patterning in artifact distribution that can occur from the combination of long-term habitation, repeated habitation of the same area (due to reoccupations or to natural and/or cultural bounded space), and natural formation processes can be difficult to disentangle. A first step in doing so, however, is clarifying the effects of natural processes. Here we focus on the role that natural formation processes played in producing the spatial distribution of artifacts seen at the Mountaineer Folsom site. The site is in a low deposition environment, with less than 50 cm of Aeolian sediments deposited on the site since its occupation 10,450 years ago. As such, natural mechanisms such as cryoturbation, bioturbation, burning, treefall, and trampling play a significant role in altering original artifact associations. Furthermore the characteristics of the natural bedrock geology of the site are critical for understanding how Folsom foragers constructed the habitations structures.

Andrews, Bradford (Pacific Lutheran University)

[322] *A Postclassic City with No Blade Workshops: How Did the Calixtlahuacan's Get Their Stone Tools?*

Analysis of the obsidian artifacts recovered from households in the city of Calixtlahuaca (AD 1130–1530) indicates that prismatic blade production was not a domestic affair. Furthermore, intensive survey did not reveal evidence of onsite blade workshops anywhere in the city. This finding is at odds with what has been reported for many other Postclassic urban centers. This paper discusses why the blade-core data are not consistent with onsite blade production. It then evaluates three models for explaining how the Calixtlahuacans provisioned themselves with blades: finished blade trade, long-distance itinerant craftsmen, or local craftsmen working outside the city limits. The discussion examines why the quantity and quality of blade production artifacts do not indicate onsite blade production, and what the ratios of proximal, medial, and distal blade sections might indicate about provisioning. Evaluating how the Calixtlahuacans got their obsidian is important for understanding how the Postclassic market system was organized outside the Basin of Mexico. By whatever means Calixtlahuaca's citizens got their blades, it is clear that after the Mexica conquest of 1474, less obsidian reached the city than was previously the case. This change is likely to have had a detrimental effect on the well-being of the city's inhabitants.

Andrieu, Chloé (CNRS Université Paris I La Sorbonne), Arthur Demarest (Vanderbilt University), Paola Torres (Proyecto Regional Cancuen), Julien Sion (CNRS Université Paris I Sorbonne) and Juan Francisco Saravia (Universidad San Carlos)

[218] *On the Frontier: Raxruha Viejo, a Late Classic Highland Exchange Center*

In the Verapaz valleys, there were sites of the major exchange route used to transport jade and obsidian from the Maya highlands to the lowlands during the Classic period. The Late Classic site of Raxruha Viejo, located on the highland side of the boundary between the Classic Maya kingdoms and their Verapaz highland trading partners, has a unique architecture and material culture of highland Verapaz style but with significant lowland elements. Overall, its assemblage and architecture appear to be totally different from the nearby Classic lowland capital of Cancuen, or any other lowland site. Yet, large quantities of obsidian found at Raxruha suggest that it could have a critical role in highland/lowland trade and raises many questions about the nature of the interactions between this site and both the lowland and highland centers. Building on the Cancuen Project research, the 2016 field season is part of a new four-year regional program that aims to characterize this highland cultural tradition, establish its chronological framework and understand its relationship with the highland-lowland exchange system, as well as to investigate the causes of its abandonment around 800 AD.

Andrus, C. Fred (Department of Geological Sciences, University of Alabama)

[382] *Productivity in a Human Context: Creating and Applying Proxies Relevant to Chicama Valley Archaeology*

El Niño-related changes in marine and terrestrial productivity impacted Chicama residents in several ways, including altering available marine species, soil productivity, and by extension, the technological and economic innovations necessary to adapt. The combination of marine and terrestrial resources were central to the economy of people living in the Chicama Valley throughout the Holocene. Estimates of El Niño's effects on past marine productivity typically rely on open ocean proxies distant to where people may have lived and fished, and may not accurately reflect the day-to-day reality of people living in a particular area. Similarly, El Niño-related flooding affected terrestrial productivity through both erosion and deposition. Therefore archaeological research would benefit from new proxies focused on the times and places relevant to human economies. Such proxies are now being developed and applied to a limited extent, and will be discussed as relevant to the Chicama Valley, with particular focus on productivity changes that may or may not have impacted people over time. For example, it is unlikely marine productivity near the Chicama Valley ever diminished to the point where a lack of resources was a meaningful threat until the advent of modern industrial fishing.

[223] *Discussant*

Angelbeck, Bill (Douglas College)

[334] *Implementing Indigenous Frameworks toward the Archaeological Record: Issues, Instances, and Directions*

While archaeology concerns a Western-derived discipline, the scope of its perspective is broadening. Here, we highlight Indigenous frameworks for the analysis and interpretation of archaeological data wherever there is direct historical and cultural continuity of people and place. To this end, we attempt to map out the contours for analyses using models and theory derived from oral traditions, language, and other schema from indigenous sources to explain patterning of artifacts and features of the archaeological record. We also consider some of the issues raised in applying indigenous frameworks within the discourses of contemporary archaeology. We include two cases from our work in Salishan territory applying frameworks derived from Coast Salish (Lushootseed) and Interior Salish (Nlaka'pamux) concepts. The first involves an analysis of settlement patterns in the Upper Skagit region of Washington state using Lushootseed spatial concepts of what constitutes a village. The second example entails an interpretation of rock art sites in the Mid-Fraser Canyon of British Columbia through an indigenous theory rooted in Nlaka'pamux perspectives. We maintain that understandings of these sites are significantly enhanced by the use of indigenous frameworks, allowing for explanations that extend beyond what can be achieved through the use of Western frameworks alone.

[334] Chair

Anglos, Demetrios [223] see Hausmann, Niklas

Angourakis, Andreas (University of Barcelona)

[356] *Linking Land-Use Patterns to Spatial Logistics, Institutional Complexity, and Terrain Constrains in Farming-Herding Interaction: A Theory-Building Agent-Based Approach*

The relation between the main variants of preindustrial economic production in arid Eurasia, from nomadic pastoralism to irrigated agriculture, is known to have been unstable, with abundant examples of conflict and shifting patterns of land use right up to contemporary times. We present the latest development of a six-year effort, within the SimulPast project, in experimenting and generating theory that could help explain the different land use patterns. Using Agent-Based simulation models, we progressively put together mechanisms hypothesized to be relevant factors in shaping the balance of farming and herding land use within this type of setting and observe their simulated consequences under a wide variety of conditions.

We will present here the design and results of two models, NomadFrontier and NomadBorder, which were built on the exploration of two previous models, Musical Chairs and Nice Musical Chairs, and introduce new aspects: 1) an explicit penalization based on spatial distances, 2) territorial marks that regulate the access to pasture, 3) a two-level institutional structure, comprising corporate groups and political associations between these, and 4) a parametric representation of terrain constraints. Last, we will compare the simulation experiments with our assessment of several historical and archaeological case studies in Eurasia.

[268] Discussant

Ankele, William (University of Oklahoma)

[344] *Survey Says?!?! A GIS-Based Comparison of Site Locations and Settlement Patterns in the Gunnison Basin, Colorado*

In comparison to the Late Paleoindian period (10,000–8,000 BP), the Early Archaic (8,000–6,500 BP) in the Gunnison Basin, Colorado is a poorly understood time because of its relatively light archaeological signature. Not only do we have a lighter archaeological record, but we also see a change in technologies, such as projectile point types in this transitional period. Some archaeologists explain these observations as a result of changing environments and shifting settlement processes as new populations move into the basin. Others suggest the results may be due to survey bias, as archaeologists continue to survey portions of the basin. I will investigate whether there is a possible difference in site selection and settlement patterns between the two time periods that may indicate a reason for this lighter signature. Using R and ArcGIS, I will create a predictive model for both the Late Paleoindian sites and Early Archaic sites and then compare the results. These results will then be plotted against previously surveyed areas in an attempt to determine the reason for the relatively small Early Archaic record in the Gunnison Basin.

Annereau-Fulbert, Marie (Centro de Estudios Mayas, UNAM)

[218] *The Central Maya Highlands during the Postclassic: A Marginal Region on the Eve of the Spanish Conquest?*

Compared to its Guatemala counterpart, the region of the Chiapas highlands is known to have a marginal history in the Postclassic period. This misrepresentation is due to limited investigations since the 1960's and to inexistent ethnohistoric sources, which could provide clues for the interpretation of ethnic and settlement patterns on the eve of the Conquest. However, Spanish documents described "cacicazgos" as Chamula and Zinacantan near Jobel Valley, which is the focal point of our study. Complex colonial reorganization in the region, in addition to a delicate current social and political context, make archaeological ruins survey difficult. However, ceramic analysis from two sites and archival studies allow us to strengthen, and provide results which contrast with the previous prehispanic model for this cultural area, giving rise to interesting discussions and perspectives abroad about interactions at a regional level.

Anschuetz, Kurt F. (Rio del Oso Anthropological Services, LLC) and Kurt E. Dongoske (Zuni Cultural Resource Enterprise)

[394] *Hadiya:wa: Do You Hear What Traditional Pueblo Cultural Advisors Are Saying?*

Archaeological collaboration with traditional Pueblo communities faces many practical challenges. Archaeologists typically expect cultural practitioners to accept what archaeology entails as a scientific discipline and its approach to understanding the past. Within traditional Pueblo perspectives, archaeological excavation might not be an appropriate measure for mitigating adverse effects in the federal Section 106 compliance process. Rather than asserting the primacy of their preferences and values, archaeologists should be receptive to indigenous perceptions and attitudes about what archaeology is and what archaeology does. Hearing can facilitate the opening of communication avenues for cross-cultural explorations into the multiplicity of truths about the past.

Anschuetz, Kurt F. [34] see Garcia, Damian

Antczak, Andrzej T. (Faculty of Archaeology, Leiden University, The Netherlands) and Maria Magdalena Antczak (Faculty of Archaeology, Leiden University, The Net)

[395] *Rancherías: Historical Archaeology of Early Colonial Campsites on Margarita and Coche Islands, Venezuela*

Little is known from the present-day archaeological perspective of early colonial realities of Margarita and Coche islands located in north-eastern Venezuela, in the state of Nueva Esparta. Moreover, the island of Coche has never been surveyed archaeologically. This paper discusses the preliminary results of systematic archaeological surveys of Coche and the southern coast of Margarita Island, carried out within the frame of the Nexus 1492 ERC research project coordinated by Leiden University. Colonial materials and sites were located on both islands. All sites yielded pre- and post-1550 Spanish and other European ceramics, as well as Amerindian pottery and possibly intercultural hybrids. Activities related to pearl fishery and goat breeding are most probably responsible for the presence of the ephemeral settlements or rancherías that were located in these places. These were contemporary with and also slightly posterior to the core Spanish town of Nueva Cádiz that flourished on the island of Cubagua between 1528 and 1542.

Antczak, Andrzej T. [384] see Antczak, Maria Magdalena

Antczak, Maria Magdalena (Faculty of Archaeology Leiden University) and Andrzej T. Antczak (Faculty of Archaeology Leiden University)

[384] *"Winged Worldviews": Human-Bird Entanglements in Northern Venezuela, AD 1000–1500*

Drawing from archaeology, zooarchaeology, ethnohistory, ethnology, and avian biogeography, this paper aims at (re)constructing the interrelations between indigenous peoples and birds in north-central Venezuela, between AD 1000 and 1500. Amerindian narratives and premises of perspectival ontology from the South American Lowlands suggest that certain birds were more closely interrelated with humans than other beings. The analyses of nearly 3,000 avian bone remains recovered in six late Ceramic Age sites located on the Venezuelan Caribbean islands and on the adjacent mainland indicate that the uses of birds as food, a source of raw material, and a symbol were culturally contingent. Formal and contextual analyses of bird imagery

crafted in pottery, stone, and shell also suggest culture-specific uses and entanglements. Differences are especially visible between the Cariban-speaking Valencioid pottery makers from north-central Venezuela and their neighbors from the north-western coast, the Arawakan-speaking Dabajuroid, during the last centuries before the European Conquest.

Anthony, Alexander [188] see Picard, Jennifer

Anthony, David (Hartwick College)

[221] *Ancient DNA Analysis and the Indo-European Dispersal*

New methods for analyzing ancient human DNA are introducing a new “molecular archaeology.” aDNA permits us to detect mating networks, to see ancestry evolve across generations as populations expanded or died out, to track migrants and their genes across geographic space, and to say whether and with what frequency migrants and the indigenous population mated at the destination. aDNA analysis is an unprecedented tool for the study of ancient migrations, kinship, and biological adaptation. This paper reviews recent studies of the aDNA of more than 300 prehistoric people from Europe, the steppes, the Caucasus, and Central Asia that revealed a massive migration of steppe pastoralists westward into agricultural central Europe and eastward to the Altai Mountains, previously occupied by foragers, dated about 3000–2500 BC. The dispersal of the Indo-European languages can be dated independently to the same period, after the invention of the wheel and before the IE languages differentiated in the second millennium BC. Genetics suggest a delay in intermarriage at the destination, and archaeology suggests an initial material contrast, so language shift in agricultural Europe might not have happened with the initial migration but developed later after the mobility patterns and resources of the two populations converged.

Antonelli, Caroline (University at Albany—SUNY)

[44] *The Myth of a Marginal Environment: Redefining a Yucatecan Landscape*

This paper examines shifting environmental paradigms in the Maya realm. Using Mayapán as a case study, a site long-considered to be located in a “marginal” environment for agricultural productivity, I will evaluate site resilience, sustainability, and self-sufficiency and use these concepts to create a more nuanced perspective of human-environment interactions. Data from Mayapán will be cross-referenced to other similar sites across the Maya region. I will show that assumptions about the environment in the Northern Yucatán Peninsula is rooted partly in culture historical interpretations of the previous century. Modern investigative techniques from the last twenty years have allowed for more robust scientific research that contrast the environmental perspectives of the past, challenging these long-held beliefs and opening up new avenues of research. These new investigations show that the environmental history of the Maya in the Northern Yucatán Peninsula is even more complex than previously understood. Occupation in this area is both highly adaptive and stable at different points in time.

[44] *Chair*

Antonites, Alexander (University of Pretoria)

[161] *Building a Network: Territorialization and Deterritorialization in Thirteenth-Century Northern South Africa*

Regional social complexity in southern Africa is closely tied to the rise and development of the Mapungubwe polity of thirteenth-century South Africa. Expanding political power and influence meant that Mapungubwe increasingly articulated with communities on its periphery—a relationship that is reflected in shared material culture. These hinterland sites are all located in areas where there is an absence of earlier twelfth century occupation, which suggests a process of active settling of these areas rather than extant local communities adopting the trappings of Mapungubwe material culture. The maintenance of social hierarchy at Mapungubwe is widely believed to be based in the ability of elite to attract followers and monopolize long distance trade goods. This process of concentration required spatial expansion to draw in distant resources such as gold and ivory. Paradoxically, ongoing research on hinterland sites suggest that this territorial expansion resulted in a weak hierarchical control over these remote areas, resulting in a concomitant deterritorialization as distant communities enjoyed growing autonomy and authority.

Appleby, Jo (University of Leicester)

[31] *Osteobiography as Local Biology*

Osteobiography is an increasingly popular approach, but one that can have the effect of producing unproblematic, individualized approaches to the life course. In this paper I wish to explore how we can create a theoretically informed osteobiography. I propose two strands to this. Firstly, rather than osteobiography being something that “happens to” individuals living in a society, I suggest that it constantly emerges through inter-relations with culturally specific understandings of the person that are deeply contextualized. Secondly, I bring in the concept of “local biology” to explore how, rather than tracing events that happen to bodies, osteobiography can be better conceptualized through the continual interaction of genes, environment, culture and society. This interaction shapes not just immediate responses to disease or stress, but changes the potentials of the person throughout the life-course. These ideas are explored through a consideration of the process of ageing.

Aquino, Valorie (University of New Mexico), Douglas J. Kennett (Pennsylvania State University), Yemane Asmerom (University of New Mexico) and Keith M. Prufer (University of New Mexico)

[162] *Comparison of a Community-Scale Classic Maya Political Adaptive Cycle with a Bimonthly-Resolved Paleoclimate Record from Uxbenká, Belize*

In studies of human-environment interactions, the conceptual framework of panarchy and its associated resilience theory posit that periods of stability and transformation are inevitable in what has been termed an “adaptive cycle.” This presentation discusses the reconstruction of a community-level political adaptive cycle for Uxbenká, an ancient agrarian polity in the Maya hinterlands, and explores its linkages with the broader political ideology of divine kingship and climate stress. Employing Bayesian age modeling of more than 60 radiocarbon dates associated with construction events and data on a potential dynastic lineage, along with the introduction of original, bimonthly-resolved local paleoclimate data, we assess cycles of growth, maintenance, decline and renewal in the built environment history of the civic-ceremonial precinct as proxies for the stability or instability of political power and authority. Furthermore, while multiple studies have compared cultural records with rainfall abundance and deficits, we discuss the important role of short- and longer-term climate unpredictability from an ultra-precise speleothem paleoclimate record. This work produces insights on some of the conditions that confer or erode the resilience of political actors embedded in a coupled socio-natural landscape.

Aragon, Leslie (University of Arizona)

[205] *Discussant*

Aragon, Leslie [74] see Borck, Lewis

Arakawa, Fumiyasu (New Mexico State University) and Trevor Lea (New Mexico State University)**[303]** *Salvage Excavation: NMSU Summer Field Project at the South Diamond Creek Pueblo in the Northern Mimbres Region*

New Mexico State University (NMSU) anthropology students spent the summer of 2016 getting to know a bit more about the Mimbres people who lived more than 1,000 years ago, and along the way helped preserve their history. Eight NMSU students joined community volunteers for four weeks to explore and excavate areas of the South Diamond Creek Pueblo (SDCP) in the Gila Wilderness of New Mexico. The project had three major goals: 1) to contribute to our understanding of cultural trajectories in the northern Mimbres region, 2) to assess the damage to the site by erosion and looting activities, and 3) to learn about being stewards of cultural resources for the public at large. This project was remarkably successful and several NMSU students have used data from the excavations for their own research. Their projects are diverse and include studies of ceramic exchange, lithic toolstone procurement, and environment-human relationship on this landscape. In collaboration with NMSU students and volunteers, the SDCP project helps us improve our knowledge of when and how the Mimbres people inhabited southern New Mexico from AD 900 to 1150.

Arakawa, Fumiyasu [303] see Duran, Paul A.

Arano Recio, Diana [140] see Chatters, James

Aranyosi, Floyd, David Davis (Central Washington University), Ashley Garrett (University of California, Santa Cruz) and Caroline Hartse (Olympic College)**[194]** *"Yama Village: Community College Students Develop an Archaeological Analysis of a Historic Transnational Japanese Community in Washington State."*

Olympic College has created a field school around the historic Japanese immigrant site of Yama Village, on Bainbridge Island, WA. A field school associated with a community college offers access to professional training to a selection of students who would otherwise not have access to this education. Our multidisciplinary approach provides students with comprehensive field experience in the effort to recover this "hidden chapter" in Washington State history.

Aráoz Silva, Miriam [331] see Covey, R. Alan

Arazi-Coombs, Sandra and Carrin Rich (National Speleological Society)**[273]** *Restoration of Sandia Cave, NHL, New Mexico*

Sandia Cave is a National Historic Landmark that has played an important role in the history of archaeological thought about the Paleoindian period and Southwestern archaeology. The cave is also a designated traditional cultural property that is culturally significant to numerous Pueblo groups. Despite its cultural and historical significance and popularity as a tourist destination, the integrity of the cave has been severely diminished by heavy and repeated acts of vandalism over the years. It was severely blackened with soot from fires illegally lit in its interior and extensive graffiti was spray-painted inside the cave. The graffiti was thought to potentially obscure valuable information (historic and precontact markings) located on the rock surface. In 2015, a grant funded restoration work in the interior of the cave. A collaborative team of cave specialists and archaeologists (with input from tribal governments) developed a series of innovative restoration techniques to ensure that the natural and cultural significance of the site was maintained during the restoration process. This presentation will discuss the techniques that were developed and the success of the project as a way of deterring future vandalism at the site.

Arazi-Coombs, Sandra [301] see Kulisheck, Jeremy

Archer, David and Christine Mueller**[176]** *Archaeological Investigations on the Lucy Islands, Near Prince Rupert, BC, from 2010 to 2013: New Evidence Relating to the Development of North Coast Culture*

In the summer of 1966, George MacDonald launched the wide-ranging North Coast Prehistory Project. One of his goals was to document the broader patterns of human settlement along the north coast of British Columbia, and in 1968, this led to the first test excavations at GbTp-1, a small seasonal encampment on the Lucy Islands, 19 km west of Prince Rupert, in the open waters of Chatham Sound. The data from that excavation showed that this remote site was already inhabited by about 2,500 years ago, placing it firmly within the Middle Period (3500–1500 BP) in the emerging local sequence. Recent work at this site, from 2010 to 2013, shows that the occupation actually began as early as 9,500 years ago. At that time, sea levels were higher, and the archaeological evidence is therefore located well above the modern shoreline. Although limited in scope, the latest research offers several new insights into that poorly known early period in the development of north coast culture.

Archila Montanez, Sonia (Los Andes University, Department of Anthropology), Mónica Berón (CONICET, Museo Etnográfico), Gabriela Musaubach (CONICET, Museo Etnográfico), Martha Mejía (Los Andes University, Department of Anthropology) and Eliana Lucero (Universidad de Buenos Aires, Museo Etnográfico)**[174]** *Ancient Woods Used in a Ritual Context at Chenque I Cemetery (Pampean Region, Argentina)*

Empirical evidence of ancient ritual practices is not often found in many archaeological sites. This complex ideological aspect of past human societies has usually been reported in association with the presence of monuments such as sculptures, tombs, funeral mounds, temples and shrines and also with particular artifacts used during ceremonies and rituals such as ceramic, stone or metal vessels, musical instruments and so on. Archaeobotanical evidence could contribute enormously to the study of ritual practices particularly in contexts where ritual practices involved many other different paraphernalia including plants, animals, minerals and artifacts made of perishable materials such as wood and fibers. Identification of plant remains in itself constitutes a source of information about cultural choices. Chenque I site is a cemetery, which includes several human burials and was used between 1050 and 290 BP by hunter-gatherers groups inhabiting western Pampean region in Argentina. We studied and identify charcoals from burial structure 28 in which funerary practices such as burning of human remains have been recorded.

Ardayna, Yann (UMR 7268 Marseille) and Marc Maillot (Section Française de la Direction des Antiquités S)**[219]** *The Medieval Necropolis of Mouweis (Shendi Area, Sudan): Bioarchaeological Insights*

The site of Mouweis is a Nilotic city of the Meroitic period excavated by the Louvre Museum since 2007. This settlement includes a first-century AD palace, later destroyed and reduced to a hill-shaped ruin. During the medieval period, a cemetery was created in the demolition level of this palace. Radiocarbon dating reveals a funerary occupation between of the eighth to the fourteenth century. Burials were mainly individual with a uniform typology and follow the same orientation as the structure of the Palace, and excavations highlighted a concentration of seven burials at the center of the Palace. The particular layout suggests a funerary layout from the center to the periphery, and this (according to social status, age-at-death, sanitary state, sex ...) is the basis of our paleobiological study. The sample represents 21 individuals (17 adults, 4 juveniles). The central group covers a largest number of pathological conditions and one of the most significant results of the paleobiological analysis is a case of leprosy. Although the presence of this infection in that particular region was known, paleopathological cases remain particularly scarce in medieval Sudan.

Ardelean, Ciprian (University of Zacatecas, Mexico)

[140] *New Indicators of a "(Much) Older-Than-Clovis" Cultural Presence at Chiquihuite Cave Archaeological Site in Zacatecas, Mexico*

The systematic search for ancient human presence in the Zacatecas semi-desert of central-northern Mexico continued with new field explorations and excavations during 2016. A new season at the Chiquihuite Cave was meant to verify the weak signals of older-than-Clovis human presence obtained a few years ago. The new extended excavation inside the high-altitude cave revealed two old, clearly differentiated cultural components that had not been acknowledged before. The upper component is clearly laid upon a well-defined occupation floor far away from the entrance, next to the rear walls of the main chamber. It consists mainly of a relatively rich lithic assemblage, while the study of other proxies is under way. It is true that several questions must be made about the assemblage, especially due to its raw material and the technological attributes, but its cultural origin is self-evident. Multiple radiocarbon dates yielded matching results of an age much older than 14,000 cal BP. Another component, much weaker in its characteristics, seems to exist below the upper one, manifested as cultural finds distributed vertically to a considerable depth. Several radiocarbon results suggest an apparent age for the oldest cultural presence going beyond currently accepted dates.

Ardren, Traci (University of Miami)

[5] *Chair*

Ardren, Traci [329] see Dine, Harper

Arendt, Beatrix [365] see Hacker, Stephanie

Argüelles Echevarría, Amaranta [225] see Elizalde Mendez, Israel

Arieta Baizabal, Virginia (Universidad Veracruzana) and Ann Cyphers (Instituto de Investigaciones Antropológicas)

[10] *Densidad poblacional y sus implicaciones socio-económicas en la primera capital olmeca de San Lorenzo, Veracruz*

En los últimos años, los análisis de densidad poblacional y distribución espacial conforman un tema medular en torno al desarrollo de las sociedades, ya que la forma en que se distribuye una población humana en el espacio conlleva determinantes efectos en la estructura interna de la sociedad y, viceversa, la interrelación de los factores económicos, administrativos, políticos y culturales en la sociedad son el reflejo de la organización espacial. El presente cartel muestra los resultados de un estudio que permitió reconstruir el número y tamaño de las estructuras arquitectónicas ubicadas en los diversos sectores del sitio y, a partir de éstos, estimar el número total de pobladores en el asentamiento con el fin de llegar a inferir tendencias en el desarrollo de la primera capital olmeca de San Lorenzo, Veracruz.

Arilla, Maite [389] see Rosell, Jordi

Arjona, Brenda

[19] *Gender and Obsidian Economy in Mesoamerica*

Obsidian tool production in Mesoamerica has been considered primarily the work of men. It is important to examine the roles that women might have had in obsidian crafting. This paper uses results from a study of an obsidian assemblage from an unusual burial excavated at Puerto Escondido, Honduras, to explore the implications of women possibly being involved in stone tool production. In this burial one person was laid out on a bench, wearing an obsidian mirror, in a below-ground chamber, that was then filled with ashes and carbon from incense burning, smashed ceramics, and obsidian tools made from flakes and blades. Analysis of chemical composition using XRF shows that obsidian flakes at the site mainly came from local sources, while blades were imported from centers of specialist production. The use of local obsidian for expedient tools (confirmed through study of residues as used to process plant material) suggests other recorded examples of women making stone tools they use for common tasks. The mixed economy of obsidian at Puerto Escondido, with blades acquired from specialist centers and flake tools made from local material, could correspond to a division between a male gendered specialty and expedient production that included women.

Arksey, Marieka (University of California, Merced)

[204] *Politicized Use of the Spaces outside of Caves during the Terminal Classic Maya Collapse*

This paper investigates the use of caves as performance spaces for water and agriculturally focused rituals during the Maya Late Classic period (~ AD 750–900) and the events of the "collapse." Although the "collapse" of the social, economic, and political systems during this period has been the subject of much study, the majority of research has focused on the environmental factors with little consensus as to how rulers attempted to maintain order, social solidarity, and political power during this time of crisis. Drawing on perspectives grounded in performance theory, ethnography, and traditional archaeology, this paper examines how the use of caves was expanded during the collapse to include the more visible and accessible exteriors of caves for the first and only time in over 2,000 years as rulers attempted to garner favor with the increasingly dissatisfied general populace.

[204] *Chair*

Arkush, Brooke

[339] *Glimpses of Promontory Tradition Settlement Practices and Social Networks: The Ceramic and Faunal Assemblages from Site 10-Oa-275*

The West Fork Rock Creek site (10-Oa-275) is a late prehistoric-aged seasonal camp in southeastern Idaho containing 11 occupational surfaces dating between AD 750 and 1800. Several living floors and nonliving floor deposits contain both Promontory Gray and Great Salt Lake Gray ceramics, along with the butchered remains of bison and pronghorn. This paper explores associations between site occupants and Promontory groups to the south,

especially those of the Promontory Peninsula, and considers Promontory and Fremont interactions more generally. Various Promontory groups incorporated eastern Idaho within their home range, perhaps primarily to exploit large-game herds and obsidian sources of the upper Snake River region. The 10-Oa-275 assemblage has improved our understanding of Promontory settlement systems and socioeconomic interactions in areas beyond the Wasatch Front, two important topics that have received sparse attention from previous researchers.

Armada, Lois [324] see Criado-Boado, Felipe

Armijo Torres, Ricardo [349] see Gallegos Gomora, Miriam Judith

Armit, Ian (University of Bradford), Lindsey Büster (University of Bradford), Rick J. Schulting (University of Oxford), Laura Castells Navarro (University of Bradford) and Jo Buckberry (University of Bradford)

[139] *Postmortem Interactions with Human Remains at the Covesea Caves in Northeast Scotland*

As liminal places between the above-ground world of daily experience and the underworld, caves form a persistent focus for human engagements with the supernatural. As such they have frequently been used as places for the dead, whether as final resting places or as places of transformation. Late Bronze Age human remains were recovered from the Sculptor's Cave, on the Moray Firth in northeast Scotland, during the 1920s and 1970s. They suggest the curation and display of human bodies and body parts, associated with wooden structures and a range of objects dominated by small personal ornaments. Recent fieldwork at the nearby Covesea Cave 2 has revealed similar evidence, as have other caves along the same stretch of coast. The Cave 2 assemblage displays evidence for excarnation, trauma, selective redeposition and processing of bodies and body parts. Although individuals appear to have entered the cave whole, certain elements were subsequently removed, while others appear to have been displayed. In this paper we consider the ways in which the Late Bronze Age communities of this region interacted with their dead and consider the role of the Covesea sea caves as a coastal mortuary landscape.

[254] *Discussant*

Armit, Ian [68] see Büster, Lindsey

Armitage, Spencer

[263] *Vertebrate Analysis of Column Samples Taken from Hup'kisakuu7a (93T, DfSh-43)*

Hup'kisakuu7a (93T, DfSh-43) is a small precontact site in Tseshah territory. This site was excavated in 2015 and 2016 in order to determine to what extent smaller sites in Barkley Sound were being used during the late and mid-Holocene (ca 5000–200 cal BP). Two 2 x 2 m units were excavated. A column sample was taken from the north wall of each unit in 2016. These column samples reached a depth of 120 cm depth below datum (DBD) in unit 1, and 137 cm DBD in unit 2. The sediment recovered was screened through 6.35 mm and 2 mm mesh. In this poster I present vertebrate analysis of the material recovered from these column samples. This analysis was done to determine spatial site use, environmental variability and ensure accurate representations of fauna were recovered from different areas of the site. My findings from Hup'kisakuu7a are then compared to column sample data from three larger sites in Barkley Sound; Huu7ii (DfSh-7), Kakmakimilh (306T, DfSh-17) and Ts'ishaa (204T DfSi-16). This comparison determines Hup'kisakuu7a has a lower NSP per liter than its larger counterparts.

Armstrong, Alan (Northwestern University)

[317] *Chronological Evidence of Material and Landscape Changes Associated with a Shift in Colonial Control at the Morne Patate Plantation, Dominica*

Morne Patate Plantation in southern Dominica (occupied between the 1740s and 1950s) provides us with an opportunity to examine a setting that underwent major changes in social organization and economic engagements associated with the shift in colonial control of the island from the French to the British in 1763. This paper presents an overview of the chronology of the archaeological contexts at the site and changes in settlement organization. This material record provides evidence for discrete phases of occupation which can be tracked through the changes in the altered landscape and the footprint of the plantation. This study examines changes in chronologically sensitive ceramic assemblages that correlate with modifications in the landscape, and changes in buildings constructed at the site. Morne Patate has two main phases of occupation with distinct patterns of material culture and use of space. This change in settlement organization paired with the site chronology provides an important archaeological context to observe different uses of materials and varying domestic production strategies that occur in separate phases of the plantations occupation.

Armstrong, Chelsey GERALDA

[77] *Unique Ecologies of British Columbia*

It is widely understood that humans have varying degrees of influence on a wide range of ecological patterns and processes. In British Columbia an array of landscape management practices have been documented among Indigenous communities resulting in novel ecosystems. Yet, little is known about the range and extent of these eco-human dynamics in pre-settler colonial contexts. We explore the concept of "unique ecologies" as a way of better understanding the untold past of ecological and cultural factors that result in the landscapes we see today. We define unique ecologies as anthropogenically managed landscapes that support the succession and maintenance of culturally important plants including, crab-apple (*Malus fusca*), black hawthorn (*Crataegus douglasii*), hazelnut (*Corylus cornuta*), red elderberry (*Sambucus racemosa*), and dominant sub-canopies surrounded by important berries, roots and fibers. The association of unique ecologies with significant archaeological habitation sites, such as houses and large processing features, help us document how Indigenous people created equitable climates, fertile forests, and reliable supplies of foods and medicines. The ongoing documentation of unique ecologies in BC expands our understanding of subtle historical social-ecological relationships, while also forming and reifying oral histories and traditions, and offering lessons on how to live well on the land.

[77] *Chair*

Armstrong, Chelsey GERALDA [77] see Rodrigues, Antonia

Armstrong Oma, Kristin (University of Stavanger)

[35] *Long Time—Long House: Dwelling with Animals in Scandinavia in Prehistory*

The three-aisled longhouse is one of the most long-lived forms of dwelling-place known from prehistory, with its span from the Early Bronze Age (1500 BCE) until the Viking period (10,000 CE). During some 2,500 years, the architectural outline and form remained surprisingly similar. The three-aisled longhouse is, in terms of human culture (albeit not in geological terms), a *longue durée* institution, a materialization of a particular lived space, where humans and domestic animals lived under the same roof. The aim of this paper is twofold: First, I explore the tenets of this lived space, and its

implications in terms of social practice with a particular regard to the life-space shared between humans and animals inside the longhouse. Further, I examine the dynamics between patterns of change in prehistoric societies and the longhouse that endures as a basic building block for the farming household. I use the ontological turn as a framework for thinking through both of these topics. I mainly focus on the archaeological record from early Bronze Age until the Viking period in Rogaland, SW Norway.

Armstrong-Fumero, Fernando (Smith College)

[280] *Discussant*

Arnault, Charlotte (CNRS) and Mélanie Forné (associated researcher CNRS)

[125] *Multiscale Diversity in Classic Decorated Pottery in the Hiix Witz kingdom of the Western Maya Lowlands*

A political entity defined mainly on epigraphic evidence, the Hiix Witz kingdom includes at least three head centers, Zapote Bobal, El Pajal and La Joyanca, all located south of the San Pedro Mártir River. The architecture, sculpture and ceramics of the three sites were subjected to extensive studies from 1999 to 2006, also in 2012, suggesting that this entity consisted of relatively heterogeneous components that must have entertained distinct relations with neighboring regions of the West-Central Petén Zone. The goal of this study is to assess the subregional (Hiix Witz) and intersite (the three centers) diversity in service polychrome types and decorative modes of domestic ceramics. Correlating this diversity with possible population movements, trade routes, market networks, and fluctuating political relationships with surrounding polities may open new ways for the identification of major Classic players in West-Central Petén politics.

Arneborg, Jette [32] see Dugmore, Andrew

Arnett, Chris (University of British Columbia,)

[175] *Method and Theory in the Archaeology of Interior Salish Rock Art Sites on the British Columbia Plateau.*

Interior Salish rock art sites on the British Columbia Plateau are multicomponent assemblages which include the geomorphology, the rock art and other surface and subsurface elements such as trails, manuports, petroforms, hearths, lithics, radiocarbon dates, flora and fauna. Defining the interrelationships of these components is essential to understanding the site formation process. In addition, direct historical and cultural continuity between these sites and Interior Salish descendant communities allows conventional archaeological methods to combine with intergenerational knowledge of place and time (indigenous theory) to give finer resolution to the interpretation of site activities.

[334] *Chair*

Arnett, Chris [334] see Angelbeck, Bill

Arnn, Anna (Hamilton College), Nathan Goodale (Hamilton College), Alissa Nauman (Hamilton College) and Bruce Wegter (Hamilton College)

[343] *Ea-IRMS and the Isotope Ecology from Faunal Remains at the Slocan Narrows Site, Upper Columbia River Area, Interior Pacific Northwest*

Isotope ecological signatures can add to the overall understanding of terrestrial and aquatic species' diets that are present at an archaeological site. In this paper we analyze fauna specimens from across the breadth of species found at the Slocan Narrows site, an aboriginal pithouse village occupied from 3,100 cal BP to the late eighteenth century in the Upper Columbia River area of the interior Pacific Northwest. We utilize EA-IRMS to measure δN , δC , and δO isotope ratios to obtain an understanding of the dietary ecological landscape of the local habitat at Slocan Narrows. Fauna specimens used in this study come from well documented pithouses dating to 1065 cal BP, 533 cal BP, and 405 cal BP, providing a temporal examination of the isotope ecology of the site through the later phases of the village occupation.

Arnold, Bettina (U. of Wisconsin-Milwaukee)

[324] *"And Make Some Other Man Our King": Mortuary Evidence for Labile Elite Power Structures in Early Iron Age Europe*

"... we have been set free ... by our most tireless prince, King and lord, the lord Robert ... Yet if he should give up what he has begun, seeking to make us or our kingdom subject to the King of England or the English, we should exert ourselves at once to drive him out as our enemy ... and make some other man who was well able to defend us our King" (Declaration of Arbroath April 6, 1320). The Romans in first-century BC Gaul and the English in fourteenth-century AD Scotland described the political structures of the Celtic-speaking European peoples they encountered as chaotic and decentralized. Historians and archaeologists have tended to represent such sociopolitical lability as a weakness in the struggle of indigenous peoples against the often superior military strength of highly centralized and hierarchical state-level societies. Based on the evidence for secondary elites, the pates rather than the primus, a case study drawn from the mortuary record of early Iron Age southwest Germany demonstrates that the political structures characteristic of such tribal states were both fluid and highly stable. Built on a foundation of heterarchical relationships, they have proved extremely resistant to millennia of external imperialist pressure.

Arnold, Dean (Field Museum)

[216] *Finding Prehistoric Sources of Ceramic Raw Materials in Ticul, Yucatán, Mexico: Traditional Knowledge, Materiality, and Religion*

Up until the tourist market and piped water forever changed the practice of making pottery in Ticul, potters' raw materials came from sources in a unique socially perceived and spatially restricted landscape that served them well for at least a thousand years. Revealed by ethnographic research, potters' traditional knowledge and utilization of these sources indicated that the unique sources of potters' clay, palygorskite, and pottery temper were ancient and dated to the Terminal Classic Period. Although potters no longer associate any religious meaning with these sources, ethnographic research since 1965, and comparative ethnographic and archaeological data indicate that each of these sources probably had religious meaning for the potters in the past. These sources and the materials that come from them were materialized, distilled, and encapsulated in the required use of pottery for properly performing the annual Day of the Dead ceremonies when the spirits of the dead ancestors return from the earth to the land of the living.

Arnold, T. Elliott [229] see Eusebio, Michelle

Aronsen, Gary [365] see McRae, Ryan

Arranz Otaegui, Amaia (University of Copenhagen), Ana Polo-Díaz (Department of Geography, Prehistory and Archaeology) and Tobias Richter (Department of Cross-Cultural studies and Regional)

[275] *Dung Use before Animal Domestication in Southwest Asia: Evidence from Early Natufian Shubayqa 1 (Northeastern Jordan)*

In southwest Asia the use of dung as fuel has so far only been attested at agricultural sites, which relied on the exploitation of domesticated plants and animals. In this presentation we report the first evidence for dung use by hunter-gatherers in southwest Asia 15,000 years ago. Charred dung remains were found inside two stone-made hearth structures at the late Epi-Paleolithic Natufian site Shubayqa 1. This evidence suggests that dung was recurrently gathered and used as fuel. The macro- and microscopic analyses of the dung pellets suggest that they probably derived from ovicaprids (like sheep), or alternatively, gazelle. In addition to dung pellets, fragments made of a mixture of dung and grasses were found, which may represent the remains of "dung cakes" or parts of compacted floors from penned areas. This suggests that raw dung may have been processed for the purpose of burning. The wood charcoal analyses from the two hearths indicate that the tree cover at the time of occupation was scarce. We therefore propose that at Shubayqa 1, dung was probably used as a supplementary fuel resource. Overall, these finds suggest that the use of certain animal by-products predates the appearance of domesticated animals in southwest Asia.

Arreola, David [288] see Garcia Chavez, Raul E.

Arriaza, Bernardo [143] see Watson, James

Arroyo, Barbara (Museo Popol Vuh UFM Guatemala)**[182] *New Perspectives on the Maya Highland Site of Kaminaljuyu, Guatemala***

Recent data has been unearthed on Kaminaljuyu during the last five years. Despite Guatemala City's growth, much information is still under the ground. A continuous program has allowed for the piecing together of various research programs carried out at the site. An effort to integrate most of the research and rescue programs has been done to obtain a comprehensive perspective of the culture history of the site. This paper will present data on recent research, focusing on the significant developments during the Preclassic period and its connections to other sites in the highlands and beyond. New data on the ceramic sequence and chronology, exchange, commoners' roles in the society, hydraulics systems beyond agriculture, environmental impact of Lake Miraflores changes, and others will be presented. A short summary of the relationships with the community will be presented to emphasize the role of present day society for the conservation and protection of the site.

Arroyo, Barbara [81] see Ortiz, Jose Raul

Arroyo-Cabrales, Joaquín (Instituto Nacional de Antropología e Historia) and Eileen Johnson (Museum of Texas Tech University)**[385] *North American Late Pleistocene Bear: Diversity and Resource for Early Peoples***

North America had a large and varied bear diversity (Mammalia, Carnivora, Ursidae) during the late Pleistocene. At least seven species occurred from southern Mexico and Belize north, as far as Alaska and the Yukon, constituting the subfamilies Tremarctinae and Ursinae. Tremarctinae had at least four species: two short-faced bears pertaining to the genus *Arctodus*; the spectacled bear *Tremarctos floridanus*; and an undescribed species, probably within the genus *Arctotherium*. All of which are extinct today. The three ursine species are extant, but their populations and distribution ranges have diminished from the late Pleistocene into the Holocene. The polar bear *Ursus maritimus* now is at high risk for extinction, and the grizzly bear *U. arctos* is threatened. The black bear *U. americanus*, however, is increasing its populations in some areas of its range. Few records of human-bear interaction in the Late Pleistocene are known. Those records are focused on bear being a subsistence resource for early peoples. Primary evidence is based on bone modifications. Their procurement and possible impact that such an interaction had on the diminishing bear diversity, based on the extinction patterns, is explored.

Arroyo-Cabrales, Joaquín [140] see Worthey, Kayla

Arroyo-Kalin, Manuel (Institute of Archaeology, UCL)**[325] *How Many, How Few, How Long: Precolumbian Population Density and Human Impact in Precolumbian Amazonia***

Assessing the landscape impact of past settlement and subsistence systems in space and in time is essential to reconstructing precolumbian land use in the Amazon basin. In this paper we consider archaeological and landscape evidence for past land use by examining the strengths and limitations of archaeological radiocarbon evidence as a proxy for broad demographic patterns in precolumbian Amazonia.

Arteaga Saucedo, Alejandro [179] see Donner, Natalia

Arthur, John (University of South Florida St. Petersburg), Matthew Curtis (UCLA Extension), Susan Kooiman (Michigan State University) and Kathryn Arthur (University of South Florida St. Petersburg)**[21] *Beer, Porridges, and Feasting in the Gamo Region of southern Ethiopia***

Porridges and beer make up a majority of the household diet throughout much of rural Africa and could possibly be some of the earliest foods produced. In Africa, pottery is one of the primary culinary tools used to make both porridges and beer. This ethnoarchaeological and archaeological research explores pottery using use-alteration and morphological analyses from the Gamo of southern Ethiopia to indicate the use of pottery as a culinary tool. Beer and porridges are considered luxury foods among the Gamo and are associated with feasts. Through the combination of ethnoarchaeological and archaeological analyses of Gamo pottery, as well as interviews of living descendants, we are able to determine that large scale feasting was occurring at the original Borada Gamo settlement of Ochollo Mulato. The identification of beer and porridges could lead to deciphering social, economic, and demographic changes in the Gamo region and beyond.

Arthur, Kathryn (USF St. Petersburg)**[274] *Knowing My House: An Indigenous Theory and Practice of Being***

The Gamo, who live in the highlands on the edge of the southern Ethiopian rift valley, are known for their unique and beautiful household architecture. Tourists ogle their oval basket-like grass houses and peer inside for mere minutes hoping to observe some secret moment or practice previously unknown to them. Similarly many archaeologists long to feel beneath their trowels a widespread hard surface indicative of a house floor. We remove the tangible aspects of the home, bit by bit, hoping to discover a preserved moment, day, or life time from the past, as a door to understanding how the house and its materials were interdependent with their residents' activities and identities. In the Gamo way of knowing the world, the entangled entities of humans, homes, and household materials are living beings and as such they all engage and experience the life process together. This article offers an

alternative way of knowing and being in the world as a theory for understanding the daily lives of farmers and craft specialists as materialized in and near their homes—an ontology of the house.

[314] Moderator

Arthur, Kathryn [21] see Arthur, John

Artz, Joe Alan [342] see Doershuk, John

Ashby, Steve [96] see Muñoz-Rodríguez, Mariana

Asher, Brendon (University of Kansas)

[344] *Gunflints from the Central Plains: Technological Characteristics and Chronological Implications*

The time-sensitive characteristic of gunflints makes them important chronological markers at archaeological sites. This poster reviews gunflints from select sites primarily within the eastern Central Plains that have known dates and well documented histories. Lithic materials, origin of manufacture and method of production, as well as technological characteristics of gunflints are discussed. English, French, and Native made gunflints are considered. Native produced gunflints offer an opportunity to explore the influence of culture contact on material culture change during a dynamic period of trade, interaction, and resultant modifications to traditional chipped stone technologies.

Ashley, Ceri (University of Pretoria)

[161] *Creating the "Imagined Community" of Mapungubwe*

Mapungubwe's influence spread deep into the regional hinterland, drawing in far-flung communities, trade networks and people. The traditional picture of a centripetal economy however has been challenged recently by work at these so called peripheries, indicating unexpected levels of autonomy and material wealth. While the place of these newly explored hinterlands need to be re-theorized and their agency acknowledged, there is danger in swinging the interpretive pendulum too far toward a centrifugal social structure of loosely linked political groupings. In this paper, as a complement to the idea of deterritorialization, I will argue that alongside the uncoupling of hinterland economies from the putative core, there were nevertheless, continued iterations of belonging and community that bound the disparate entities. Drawing on the concept of the 'imagined community' that acts and articulates beyond the proximate, face-to-face contacts of the 'natural' community, I will explore how material culture consumption helped reinforce and maintain this network of ties and belonging.

Ashley, Michael (Codifi, Inc.)

[70] *The Benefits of B Corps for Building Sustainable Social Enterprises in Archaeology*

Within the slender margins of academic archaeology, our funding options are extremely limited. The accepted pathways to sustainability have been institutional support (the academy) or starting a nonprofit. In both cases we all must battle over an ever shrinking grant and philanthropic pool. The alternative is to go for-profit, which has historically meant to become a CRM firm. In the past few years, Benefit corporations (B Corps) have become an international movement for individuals and organizations to build social enterprises who wish to use "business as a force for good." Certified B Corps are held to a higher standard than either nonprofits or academic projects in that they should expressly seek change in the world, conduct business as if people and place mattered, aspire to do no harm and benefit all, and work interdependently and be responsible to each other and future generations: "B Corp is to business what Fair Trade certification is to coffee or USDA Organic certification is to milk." We explore how one startup, Codifi, Inc., made the decision to become a B Corp and if the benefits and limitations of this new pathway for social enterprises is worth the effort (hint: it totally is).

[111] Discussant

[37] Chair

Ashlock, Phillip (CIRCA/University of Aberdeen)

[394] *Fortifying a Community through Public Archaeology: The Collaboration of Public and Private Organizations to Preserve, Protect, and Promote a Spanish-American War Fort on a South Carolina Sea Island*

In a collaborative partnership among the surrounding community, local government, private nonprofit groups, and professional organizations, the first archaeological investigations involving Phase III data recovery excavations were conducted at Fort Fremont in advance of the development of a local government sponsored interpretive center. Entrenched in a maritime forest along the Port Royal Sound, Fort Fremont is listed on the National Register of Historic Places and enhances the coastal landscape of Saint Helena Island, South Carolina. It is an Endicott Period coastal defense fortification constructed during the Spanish-American War. Throughout its history, the fort has had a complex relationship with the surrounding community. When the fort was garrisoned between 1899 and 1921, there were well-documented conflicts with the surrounding African American community, known as the Gullah people, who occupied the region long before Fort Fremont's construction. Through collaboration with local nonprofit and professional organizations, public archaeology is being used to strengthen ties with local residents and the Gullah community. The archaeological investigations and public outreach based initiatives utilized both social media and conventional means to enhance awareness and support the archaeology and history of Fort Fremont within the local community.

[206] Discussant

Asmerom, Yemane [162] see Aquino, Valorie

Astudillo, Fernando J. (Simon Fraser University)

[270] *Colonization of Paradise: Historical Ecology and Archaeology of El Progreso Plantation, Galápagos (1870–1904)*

Colonization of the Galápagos Islands started soon after Ecuadorian separation from the Gran Colombia in 1830. During this decade the Islands were legally claimed by the Republic of Ecuador and colonization projects started. Exploiting concessions were approved to national and international companies. One of these concessions was assigned to Ecuadorian businessmen Manuel J. Cobos and José Monroy to create an agricultural colony on San Cristóbal Island; 1,000 km west from the Ecuadorian coast in the Pacific Ocean. They were able to create and manage an industrial-scale plantation called El Progreso in the highlands of the Island. El Progreso operated for three decades generating significant impacts to both the terrestrial and maritime ecology. In this paper we present what we know about the past social relationships occurring inside the plantation during the second half of the nineteenth century. During the past years we have been integrating the analysis of historical written records and archaeological remains in order to explore the daily life of the plantation owners and the workers in this remote location.

[220] Chair

Astudillo, Fernando J. [220] see Wiederick, Brock

Atalay, Sonya (University of Massachusetts Amherst)

[141] *Can Archaeology Help Decolonize the Way Institutions Think? How Community-Based Research Is Transforming the Archaeology Training Toolbox and Educating Institutions*

Community-based research requires systemic shifts within institutions, from the way research is funded, protection of human subjects/IRB reviews, ethical guidelines, and what is legible/valued in tenure and promotion decisions. Some of the most important yet least discussed changes must happen in the classroom, in terms of what and how we teach. For community-based archaeologists, we know that process matters. How we conduct research with community partners is essential. The relationships and trust we build; how we design and carry out projects in a participatory way; and the formats we choose for sharing results often need to be retooled. In this paper I consider these issues in two parts. First, I examine how community-based archaeological research is helping decolonize institutions by introducing new ways of thinking about the goals, processes, and outcomes of research. Second, I consider the skills and training that community-based archaeology requires, and I present my recent encounters and experiments in cultivating literacies and competency in these areas among undergraduate and graduate students. I close by examining our responsibilities as scholars to bring about curricular change in our departments, universities, and professional organizations; including suggestions of next steps for the SAA in this area.

[172] Discussant

[172] Chair

Atha, Lucy [8] see Woolwine, Lauren

Athenstädt, Jan [296] see Slayton, Emma

Attarian, Christopher [382] see Russell, Glenn

Atwater, Chloe [162] see Winterhalder, Bruce

Aubert, Maxime (Griffith University, Australia)

[178] *The Origin of Human Creativity*

The recent discovery of cave paintings in Sulawesi dating to at least 40,000 years ago has altered our understanding of the origins and spread of the first painting traditions. This suggests that either rock art developed independently in Europe and Southeast Asia at about the same time, or that our species invented this trait prior to its initial expansion from Africa. Here I will discuss the implication of this discovery as well as new evidence from Borneo with the aim to deepen our knowledge of a major turning point in early human prehistory.

Auerbach, Benjamin (University of Tennessee) and Angela Mallard (University of Tennessee)

[287] *Modeling Conditions Necessary to Detect Gene Flow in Humans from Archaeological Contexts*

Gene flow between ancient human groups is difficult to detect. In a closed deme, variance in a morphological trait should decrease over short time periods due to genetic drift. Previous studies have thus regarded increases in within-site trait variance over time as a possible indicator for new genetic variation through flow or the physical movement of individuals. This interpretation depends on archaeological context, as diachronic changes in population variance may also arise from selection, sampling differences, or population structure changes. This study applies genetic cline theory to investigate limitations in modeling changes in trait variance due to flow over three time periods among multiple sites. We fit simulated data based on parameters obtained from archaeological dental metrics to models of genetic isolation and flow. The model for no gene flow is that trait means shift stochastically but do not change, and variances decrease over time. Departures from these conditions argue for gene flow. Changes in trait means occur when gene flow is asymmetric between groups with previously distinct trait means. We show that at least three sites from each temporal horizon are necessary to achieve an unambiguous model fit for gene flow among groups within and between time periods.

Auger, Réginald (CELAT—Université Laval), Adelphine Bonneau (Laboratoires d'archéologie Université Laval), Zocha Houle-Wierzbicki (Anthropologie Université de Montréal) and Geneviève Treyvaud (Eau Terre Environment INRS, Quebec)

[178] *Determination of Burial Locations Using Soil Analyses at the Loyola Plantation in French Guiana, 1668–1763*

Our paper discusses the approach used to determine the location of burials in an equatorial environment where organic preservation is nil. Before using the space of the plantation cemetery to preserve the memory of the enslaved who lived at the plantation we had to demonstrate the extant of the cemetery using soil analyses. Memory of that period is a fleeting souvenir among local residents and we want to use archaeology to address issues with which they are confronted in order for them to appropriate the spirit of the plantation. The Loyola Habitation under Jesuit rule reached nearly 500 enslaved whom toiled at the production of a number of cash crops such as sugar, coffee, indigo, rum, etc. under the supervision of a handful of Jesuit missionaries whose goal was to open reductions in Guaraní country. From the cemetery where approximately 1,000 people (Slaves, Amerindians and White land owners) have been interred, our motivation is to make a lasting lieu for a dialogue with history.

Auger, Réginald [178] see Bonneau, Adelphine

Augustine, Jonah (University of Chicago)

[222] *Visually Linking the Ritual and the Quotidian at Tiwanaku, AD 500–1100*

In this paper, I examine ceramic vessels, primarily serving wares, from the site of Tiwanaku, the preeminent city in the Central Andes between AD 500 and 1100, in order to examine the political effects of visual media in the ancient Andes. The paper's empirical focal point is a comparison of ceramics recovered from the monumental core and from a residential sector at Tiwanaku. My analysis is based on both attribute and iconographic data I collected during fieldwork that sought to examine the relationship between the media that were consumed at various locations within Tiwanaku. I found that there was a significant amount of shared iconography depicted on materials excavated within Tiwanaku's monumental core and on materials from the residential complex of Mollo Kontu. Based on this evidence, I argue that these ceramic vessels provided visual links between the large-scale public rituals in the vicinity of the site's monuments and the small-scale rituals and meals of people living outside of the monumental core. These links, in turn,

had a political effect on the residents of the city, as they served as reminders of those rituals in which peoples' social statuses and obligations to the broader community were most vividly manifested.

Augustine, Skye [77] see Smith, Nicole
Auld-Thomas, Luke [131] see Canuto, Marcello A.

Aura Tortosa, J. Emili (Universitat de València)

[165] *Walking before Running: Late Paleolithic Regional Dynamics in the Spanish Mediterranean Region Previous to the "Last Big Transition" (17–10 ky cal BP)*

The lapse of time between the end of the Last Glacial Maximum (LGM) and the Holocene 8.2 cold event can be considered as a Long Transition, in which global diachronic changes and regional processes are combined. Between 17–10 ky cal BP important ecological changes (increased temperatures, forestry and presence of some species of herbivores, variations in sea-level and coastline, etc.), techno-economic transformations (abandonment of osseous weapons, active and passive grinding stones related with food processing, economic trends to intensification and diversification, etc.) as well as testimonials configuration of group identities (end of parietal art, changes in personal ornaments and funerary practices). These changes are accompanied by an important continuity in sites occupation, which shows a break on the Mesolithic (ca. 10 ky cal BP), starting a fast cycle that ends with the Neolithic (ca 7.5 ky cal BP), the "last big transition."

Austin, Anne (Stanford)

[149] *Discussant*

Averett, Erin (Creighton University), Derek Counts (University of Wisconsin-Milwaukee), William Caraher (University of North Dakota) and Jody Gordon (Wentworth Institute of Technology)

[37] *From Trench to Tablet: Field Recording, Interpreting, and Publishing in the Age of Digital Archaeology*

Since the arrival of robust mobile tablet devices in 2010, archaeological documentation has increasingly become born-digital. The adoption of digital tools and practices has not gone unnoticed, with reactions ranging from enthusiastic acceptance to outright skepticism. Significantly, scholars are beginning to offer more critical and reflexive views of the issues surrounding the use of mobile devices in archaeological fieldwork, interpretation, and dissemination. The ability to disseminate digital data directly from connected devices to a global audience threatens to destabilize traditional standards of archaeological documentation practices, which, in part, used media to define the stages of knowledge production: handmade, paper documents defined the provisional character of field documentation, and the printed, bound, publication marked definitive results. Digital media blurs these distinctions by making trench side data indistinguishable from its final form. By drawing on examples from current archaeological publication schemes, this paper will show how new digital tools and techniques can highlight the potential for mobile computing in archaeology, but also demonstrate how these new methods will challenge and transform institutions that shape archaeological knowledge.

Avery, Margaret [85] see Faith, Tyler

Awayda, Conner and Leslie Aragon

[303] *Site Analysis and Excavation of the Gila River Farm Site in Cliff, New Mexico*

Archaeology Southwest and the University of Arizona's Upper Gila Preservation Archaeology (UGPA) field school excavations at the Gila River Farm Site (LA 39315) produced interesting results from the 2016 field season. The Gila River Farm Site is a Cliff Phase (A.D. 1300–1450) Salado site located on the first terrace of the Gila River, in southwestern New Mexico. It was recorded by archaeologists in the 1980s but had never been excavated. Although now protected on land owned by the New Mexico Nature Conservancy, the site has been subject to mechanical disturbance associated with agricultural activity as well as looting in the past. Despite this history, test excavations revealed more intact deposits throughout the site than had been anticipated. This poster presents the results from this season's field school and suggests future directions for preservation archaeology at the Gila River Farm Site.

Awe, Jaime

[395] *Exotics for the Gods: Lowland Maya Ritual Consumption of European Goods along a Spanish Colonial Frontier*

As a number of researchers who have focused attention on Maya–Spanish interaction along the Belize colonial frontier have noted, the relationship between these two contrasting cultures was anything but amicable. As a result of this bellicose relationship, few material goods of European origin were traded into frontier settlements. The only exceptions were a few objects that were brought in by overzealous friars as gifts to the "heathen" Maya they sought to convert to their Christian faith. And while ethno-historic reports of the missionizing adventures of Spanish priests provide us with important data on Maya life during the early colonial period, the Spanish entradas provide precious little information about the material goods they gifted to the Maya, and even less about how the Maya utilized these foreign goods. In this paper, I discuss how archaeological discoveries in Belize have been filling this void, and how the evidence suggests that a variety of objects of European origin were ritually decommissioned in sacred places.

Awe, Jaime [81] see Ebert, Claire

Ayers-Rigsby, Sara (EBI Consulting)

[291] *Discussant*

Azar, Madelaine

[283] *Quantifying Variation in Ramey Incised Motifs: A Stylistic Evaluation of Cahokian Authority across the American Bottom*

Ramey Incised jars, often considered to be indicative of Cahokia's twelfth-century Stirling Phase florescence, are characterized by angular shoulders, polished exteriors, and incised symbolic motifs arranged around the vessel orifice. Thought to be for ritual or symbolic use, the ceramic type is not only present at Cahokia, but ubiquitous across sites in the American Bottom. However, the process through which these vessels were manufactured and then disseminated is still not fully understood. An evaluation of temporal and spatial variation in Ramey Incised motifs throughout the American Bottom was conducted in order to better understand levels of standardization, elite control, and Cahokian influence involved in the production and distribution of Ramey Incised ceramics. Motif data indicate that the Ramey Incised manufacturing process was not likely concentrated within one central site. Many

Ramey Incised vessels may have been created at the site from which they originate. The results may also suggest the existence of stylistic and political autonomy, as well as cultural diversity, among many of Cahokia's satellite settlements. Contrary to proposed models of far-reaching, hierarchical Cahokian authority, American Bottom social organization during the twelfth century may be better understood in terms of a decentralized heterarchy.

Aziz, Nasullah [180] see Ono, Rintaro

Babajanyan, Astghik [221] see Franklin, Kathryn

Babala, Peter and Joseph Reti (University of California, Santa Cruz)

[303] *Subconscious Expressions of Identity in Migrant Communities: A Look at Lithic Debitage*

Subconscious expressions of cultural identity can be found in low-visibility attributes of every-day processes such as lithic production. In the late thirteenth century, Kayenta migrants into the southwestern New Mexico maintained or adapted many archaeologically visible traditions. This research examines lithic debitage assemblage morphology and attributes from three archaeological settings: southwestern New Mexican sites, Kayenta sites, and Salado sites (representing post-migration communities) during the thirteenth and fourteenth centuries to identify potential patterns of continuity and adaptation among the migrant communities. Previous research has demonstrated continuity in Kayenta traditions in Salado communities in the form of home and ceremonial structures, ceramic production and stylistic patterns, and in projectile point style. As Kayenta populations migrated in new regions, lithic production patterns changed when they were introduced to new raw material and went from having primarily chert resources to having access to abundant obsidian nodules. This research hypothesizes that low visibility attributes in the form of lithic debitage will demonstrate continuity in lithic production patterns as this migrant community engages with local raw materials.

Backhouse, Paul (Seminole Tribe of Florida)

[1] *Discussant*

Bader, Alyssa (Department of Anthropology, University of Illinois at Urbana-Champaign), Julie M. Allen (Illinois Natural History Survey, University of Ill) and Ripan Malhi (Department of Anthropology and Carl R. Woese Institute)

[176] *Metagenomic Analysis of Precontact Diet Using Ancient Dental Calculus from Prince Rupert Harbour, British Columbia*

Prior to the displacement caused by European colonization, the Coast Tsimshian harvested an array of terrestrial, freshwater, and marine dietary resources as they moved between coastal settlements and the nearby Skeena River valley. Conventional paleodietary analysis using faunal analysis and isotopic values has provided valuable data which, when paired with the knowledge of First Nations communities, can help reconstruct how ancestral communities utilized food resources prior to the cultural disruption caused by European contact. However, these methods of analysis are limited in their ability to pair the consumption of specific species with specific individuals, potentially resulting in an incomplete analysis of how individuals in these communities interacted with their environment. Building on previous archaeological analyses, this paper will present the results of a metagenomic study which used next-generation DNA sequencing methods to identify plant and animal DNA preserved in the dental calculus of ancient human remains from several sites across the Prince Rupert Harbour area. The results of this study provide an exciting new lens through which to examine traditional resource use and food-related culture within the ancient communities of the Prince Rupert Harbour area waterways.

Badger, Emily (University of Victoria) and Ryan Schucroft (University of Victoria)

[263] *Monuments in Danger? Study Done in the Jewish Cemetery of Victoria, British Columbia*

Monument preservation is an important part of remembering loved ones. Because of the wide variety of stones and manufacturing techniques, there are many factors that may contribute to monument decay. Each factor should be assessed and measures taken to prevent further degradation. For this project, we attempted to determine what factors could be at play when looking at headstone deterioration at the Emanu-el Jewish cemetery. We considered four hypotheses: first, monuments under tree cover would be in better condition than those from the same time that were under open sky. Second, upright headstones would be in better condition than those that were flat. Third, monuments closer to the ground would be in worse condition than those raised up out of grass and dirt allowing for organic growth. Finally, unpolished headstones would be in worse condition than polished headstones. As each of our hypotheses were examined, extra factors came into play that we had not foreseen (e.g., organic matter decomposing on flat monuments). We concluded that where some hypotheses were easily proven, others had complications that could be looked into in further studies.

Badillo, Alex E. (Indiana University)

[137] *Narratives of Quiechapa in Light of Material Evidence from Survey*

Our knowledge of the prehispanic past of Quiechapa and the surrounding regions has been largely based on a combination of historic sources, modern day linguistic classification, and previous archaeological work in nearby regions. El Proyecto Arqueológico de Quiechapa (PAQuie) recently completed a 99 sq. km pedestrian survey of the Quiechapa region in the Sierra Sur of Oaxaca, Mexico. In this talk, I discuss major findings from the survey in the Quiechapa region within the context of broader narratives of prehispanic southern Mexico. I combine spatial analysis of archaeological sites and architectural features with analysis of ceramic and lithic materials in order to compare and contrast the material evidence from specific sites with current narratives. I address the occupation history of the region as well as Zapotec military presence based on the initial pedestrian survey. Finally, I discuss directions for future investigations.

[137] *Chair*

Badillo, Alex E. [137] see Estes, Aaron

Badillo Sánchez, Alejandra (CRAS Project/CIESAS-Peninsular Doctorado en Historia)

[280] *Indicios de poder, la estrategia de control de la guerra de castas: Arqueológica e historia de la posición de la fuerzas armadas porfirianas en la Campaña militar de Yucatán de 1899-1901.*

En el contexto de la última época de la guerra de castas. El gobierno de Porfirio Díaz manda a construir un sistema de fuertes en la zona centro oriental del estado de Yucatán, con el objetivo de tomar el control del territorio que por más de cuarenta años había estado dominado por los mayas "rebeldes." Excavaciones realizadas, así como recorridos en la zona revelan la planeación, ubicación y arquitectura de puestos militares, los cuales sugieren por una parte la estrategia del gobierno para llevar a cabo la ocupación de la región, y por otra parte y el grado de peligrosidad que percibían las autoridades frente a los mayas conedores de la zona. La evidencia arqueológica de la guerra en conjunto con documentos históricos apoyan a

reconstruir la política de reducción y los cuatro distintos frentes de operación por mar y tierra que planeó el gobierno de Díaz para retomar la soberanía del territorio de los mayas.

Baeteman, Cecile [356] see Bogemans, Frieda

Bailey, David G. [50] see Buff, Lindsay

Bain, Allison (Université Laval, Québec, Canada) and Mélanie Rousseau (Université Laval, Québec, Canada)

[285] *Hitchhiking to the New World: Archaeoentomology and the Study of Introduced Insect and Ectoparasite Species.*

This paper presents an overview of North American archaeoentomology, focusing on the study of introduced species. Seminal works on the introduction of plant and animal species during colonization suggested multiple parameters allowing for the colonization of the Americas by Old World species (Lindroth 1957) and introduced the term "European biological imperialism" (sensu Crosby 1972) to our vocabularies in environmental archaeology. Research in archaeoentomology, focusing primarily on beetles and ectoparasites found in archaeological contexts, has permitted the documentation of species introduction and dispersal in the New World during the Colonial Period (fifteenth–eighteenth centuries). While plant species and seed crops were imported intentionally, insects and ectoparasites were almost always hitchhikers, unintentionally imported during colonization. Recent archaeoentomological research suggests the early and intensive occupation of suitable ecological niches by Old World species (Bain and King 2011) however, small and relatively modest datasets have limited our understanding of the displacement of native species. Case studies will be presented from sites in Newfoundland, Quebec City, Boston and Virginia. These studies suggest that colonists continued to combat Old World pest and ectoparasites species here in the New World as they re-created European niches through settlement practices.

Baines, Kristina [162] see Zarger, Rebecca

Bair, Andrew [282] see Connell, Samuel

Baires, Sarah

[242] *The Politics of Urbanization and the Anthropocene: a View from Cahokia*

Anthropocene: a hotly debated geological epoch entangled with climate change, the Industrial Revolution, and the perceived deleterious effect of humans on the natural world. A dialectic surrounds the Anthropocene because identifying this epoch, geologically, has real implications for global politics and the future of humanity in a changing global environment. Crossland (2014) suggests that to understand the palimpsest of global human action that resulted in the Anthropocene requires us to consider a broader network of relational events that move beyond the Industrialized West. This necessitates a reorientation from a human-centric view of the world to one that considers human and other-than-human relations. Archaeology is uniquely situated to examine the Anthropocene; we are concerned with the multi-scalar interactions of humans with the natural world. In this paper, I examine the concept of urbanism at Cahokia, a precolumbian North American city, and its relationships with the Anthropocene. I discuss the implications for and results of 'city-life' that have had unique impacts on the global environment (e.g., excess garbage, modifying the natural environment, development of agriculture). My data concerns the construction of monumental earthworks and neighborhoods with the natural environment and their impact on the environment.

Baires, Sarah [283] see Baltus, Melissa

Baitzel, Sarah (Washington University in St. Louis)

[202] *A View from the Past: A Reanalysis of Archaeological Collections from the Sama Valley and Its Implications for Current Models and Chronologies of the Southern Andean Valleys*

Although limited in area compared to the neighboring Moquegua, Caplina, and Azapa valleys, the Sama valley (Departamento Tacna, Peru) with its warm temperature, perennial water sources and arable flood plain creates hospitable conditions for highlanders who settled the valley as early as Late Horizon period. In his 1567 visita, Garci Diez de San Miguel notes the presence of a Luqapa colony and an Inca Tambo at the site of Sama Grande near the modern town of Sama-Inclan. In addition, survey and test excavations by German and Peruvian archaeologists under the direction of Hermann Trimborn between 1972 and 1975 registered Formative, Middle Horizon, and Late Intermediate period sites throughout the valley. In this paper I present the results of a reanalysis of materials collected by Trimborn and his collaborators. The goal is to compare the original project notes and artifacts with current ceramic chronologies for this region, and to reevaluate past and present interpretations and models related to presence of highland populations in the Western coastal valleys of the southern Andes.

Baker, Brenda (Arizona State University)

[219] *Mortuary Variability and Identity Upstream of the Fourth Cataract*

Fieldwork upstream of the Fourth Cataract in northern Sudan reveals substantial variation in mortuary practices among roughly contemporaneous sites on both local and regional levels. Cemeteries in the Bioarchaeology of Nubia Expedition (BONE) concession on the right (north) bank of the Nile River near el-Qinefab include intervisible clusters of graves from the Kerma period (c. 2500–1500 BC) and into the subsequent period of Egyptian colonization of Nubia. These sites constitute a mortuary landscape on the desert terrace distinct from mortuary activity in the Meroitic (c. 350 B.C.-350 AD) through Christian (c. AD 550–1400) periods that is confined to the floodplain. Grave architecture and treatment of the dead in this presumed hinterland show inclusion of imported grave goods in all periods that indicate integration into extensive trade networks rather than marginalization from state-level core areas. Identities among those interred in the desert cemeteries may be reflected by grave styles and burial treatment, including presence or absence of ceramic vessels or imported objects, or inclusions that may reflect activities conducted during life (e.g., a bone implement likely used in pottery production) or more subsistence strategies. This research advances our understanding of ancient Nubian social organization, identity, and interaction.

Baker, Jack [8] see Kieffer, C. L.

Baker, Kristen

[41] *World War II Battlefield Archaeology of Tarawa*

A central tenant of military philosophy is "adapt, improvise, and overcome." Navigating battlefields requires constant adaptation to dynamic surroundings due to the interplay of several variables such as 1) preexisting landscape and terrain, 2) enemy defenses, 3) enemy opposing forces, and 4) friendly and enemy fire. To successfully navigate the archaeology of a historic or prehistoric battlefield, archaeologists must attempt to understand the variables (such as those listed) that contributed to their battlefield of interest and be willing to constantly adapt their search and recovery strategy to their findings. This presentation will detail the archaeological methods employed by History Flight specifically for battlefield archaeological purposes, and the corresponding findings that resulted from search and recovery activity in the World War II battle site of Tarawa that occurred in what is now the Republic of Kiribati, Tarawa, Betio Island. From 20 to 23 November 1943, the battle of Tarawa resulted in the loss roughly 1,200 U.S. service men and approximately 5,500+ Japanese military and Korean laborers. While the historical record details much of the events that occurred, careful forensic and battlefield archaeology has brought to light data that in some cases contradicts and in others cases confirms the historical record.

Bakhtiary, Roshanne (U.C. Davis), Rosemary Cambra (Chairwoman of the Muwekma Ohlone Tribe of SF Bay) and Alan Leventhal (Department of Anthropology, SJSU)

[381] *Stable Isotope Evidence of Seasonal Shellfish Harvesting and Consumption in Prehistoric Central California*

Shellfish played an important role in the diet of prehistoric hunter-gatherers of Central California. They were the dominant visible component in the large shell mounds that once lined the San Francisco Bay shoreline. Although Bay shellfish are present at inland sites as well, little is known about the role of shellfish in the diet and lifeways of interior populations that hauled the resource in from the Bay. This study focuses on findings from CA-SCL-330, an inland Late Period site in the Diablo Range excavated by the University of California, Davis Field School in the summer of 2016. By looking at stable oxygen isotopic signatures found in the growth rings of certain mollusk species, we can estimate the season of harvest for shellfish brought to this site. Data on individual diet can further characterize consumption patterns of a marginal resource like shellfish and open pathways of inquiry into broader behavioral and social implications including the division of labor by sex and the emergence of status differentiation.

Bakke, Gwen (Southern Methodist University) and Karen Lupo (Southern Methodist University)

[85] *What Predicts Cutmark Frequency and Intensity?*

The presence and abundance of cutmarks in zooarchaeological assemblages are often used to infer carcass acquisition strategies, butchery patterns and the general availability of prey. In this paper we analyze cutmark data derived from three hunter-gatherer ethnoarchaeological assemblages (East African Hadza, Central African Bofi and Aka and Paraguayan Aché) to investigate how well carcass-size and distribution of meat predict cutmark frequencies as measured by conventional measures such as %NISP and %MNE, and cutmark intensity (the number of marks per bone). We also examine how well other factors such as the number of consumers and food sharing influence these measures.

Bakken, Rikka [341] see Hoffman, Brian

Balázs, Ádám [196] see Duffy, Paul R.

Balcarcel, AnaBeatriz (Mirador Basin/FARES Foundation), Edgar Suyuc-Ley (Mirador Basin/FARES), Richard Hansen (University of Utah, FARES Foundation), Francisco López (Mirador Basin) and Josué García (Mirador Basin)

[337] *New Perspectives from the Late Preclassic Period in the Mirador-Calakmul Basin*

The Late Preclassic period (350 BC–AD 150) in the Mirador-Calakmul Basin is characterized by innovations in various aspects of ancient Maya society which are the reflections of an complex ideological, sociopolitical, and economic power. These ingredients were responsible for the conception and creation of large and diverse works of architecture and engineering achievements. This paper will discuss the importance of the Late Preclassic period in El Mirador and contemporary cities within the Basin system as an evolutionary process, and the data provide a reflection of the sovereignty radiated during the Preclassic period within the Basin and other surrounding cities.

Balco, William (University of North Georgia)

[103] *Excavating the Yahoola High Trestle: Spanning Past and Present in Dahlonge, Georgia*

Archival research and subsequent test excavations at the site where the Yahoola High Trestle once stood in Dahlonge, Georgia, has explored the construction, use, and abandonment of an important component of America's first gold rush. This structure supplied high-pressure water to hydraulic mining operations in the area, facilitating sophisticated mining techniques to extract gold from the surrounding landscape. This paper presents the results of archival research and archaeological testing conducted in 2015 and 2016 by student volunteers and members of the local community. The results of these excavations suggest that the trestle was likely not the imposing structure it was originally intended to be and that it was likely disassembled for scrap after it became obsolete. Regardless, the construction and operation of the trestle helped shape the developing economy in rural north Georgia during the mid- to late-nineteenth century.

[103] *Chair*

Baldini, James (University of Durham), Keith M. Prufer (University of New Mexico), Yemane Asmerom (University of New Mexico), Franziska Lechleitner (ETH Zurich) and Sebastian Breitenbach (Ruhr-University Bochum)

[162] *Identifying the Drivers of Central American Rainfall Shifts: Implications for Past, Present, and Future Human Behavior*

Yok Balum Cave's location at the northernmost extent of the Intertropical Convergence Zone (ITCZ) combined with its abundance of aragonitic stalagmites makes the site an exceptional archive of paleoclimatic information. Additionally, Yok Balum Cave is located at the heart of the Maya Lowlands, and speleothem-based paleoclimate records from the site can provide invaluable information for archaeological research. Although the Yok Balum record and most other regional climate records strongly suggest that the fragmentation of the Classic Maya Civilization was contemporaneous with a series of decadal-scale droughts, the cause of these droughts remains enigmatic. A suite of geochemical records from Yok Balum Cave stalagmites imply that the ITCZ migrated southward at that time, but this behavior is inconsistent with elevated Northern Hemisphere temperatures thought to characterize the Medieval Climate Anomaly. The solution to this paradox likely involves the complex interplay between solar activity, explosive volcanism, and the North Atlantic climate state. Furthermore, reconstructions spanning the last 500 years identify modern industrial activity as a driver of southward ITCZ migration. Considered together, the records from Yok Balum provide an excellent example of how climate change affected past civilizations and underscore the challenges faced by modern societies.

Ball, Christopher (University of Toronto)

[371] *Reassessing Perspectives on Environmental Management in Southern Ontario*

Archaeologists in southern Ontario have taken up a number of diverse perspectives for coming to an understanding of past human-environmental dynamics. While these disparate perspectives all produce something of value and contribute to the bigger picture of human-environmental relationships in the region there has been little work done in synthesizing their contributions or consolidating said perspectives into something more cohesive. This discussion is therefore focused largely on the consideration of paleoethnobotanical work in southern Ontario ranging from strict archaeobotanical reporting to the search for the origins of agriculture and ultimately to current trends observed in the shift toward more synthetic historical ecology or niche-construction based theoretical perspectives. This discussion will argue that while current trends have been almost entirely positive for our understanding of past human-environmental relationships, with special attention to the benefit of their application in southern Ontario, there is still considerable room for improvement as we strive to approach a more holistic, and nuanced view of this critically important dynamic of past societies.

Ball, Joseph (San Diego State)

[125] *Discussant*

Ballester, Benjamín (Université Paris 1 Panthéon-Sorbonne), Marcela Sepúlveda (Universidad de Tarapacá, Instituto de Alta Investi), Francisco Gallardo (Pontificia Universidad Católica de Chile-ICIIIS), Gloria Cabello (ICIIIS) and Estefanía P. Vidal Montero (University of Chicago)

[216] *Pigment Mining for Color Meanings: El Condor Mine from Atacama Desert (AD 300–1500)*

The mineralogical richness of the Atacama Desert allowed for the development of an important set of mining-extracting and metallurgic, lapidary and pigmental productive activities, which became significant activities in the sociocultural dynamics of desert dwellers. El Condor mine, an important hematite source located in the middle section of the Loa River, was exploited from the Formative Period (~AD 300) until Inka times (~AD 1500). In contrast to other mining sites in Atacama, El Condor presents a variety of activity areas: extraction pits, processing areas with multiple anvils and grinding tools, semicircular structures, and combustion zones—in addition to large dispersion of red powder spread across its surface. The production was initially developed as a craft, intensifying during later periods (since ~AD 1200) due to the increase in pigment values and the scale of consumption at regional and also supra-regional levels. El Condor mine constitutes an interesting example of a large-scale hematite operation because it articulated important exchange and relationship networks, and also serves as a relevant case for evaluating and discussing local miners negotiations during the productive reorganization after the Inka expansion to the region.

Ballester, Benjamín [134] see Vidal Montero, Estefanía P.

Balme, Jane [173] see Langley, Michelle

Balos, Angelica [294] see Lucas, Virginia

Baltus, Melissa (University of Toledo) and Sarah Baires (Eastern Connecticut State University)

[283] *Building below the Surface: Earth Moving and Caching at Cahokia's CABB Tract*

Human engagement with the world includes forging and maintaining relationships with social agents, both visible and invisible. Among Native North Americans, these relationships are simultaneously religious, social, and political. We explore these relationships using data from our 2016 excavations at Cahokia's CABB (Courtyard Area Between Borrows) Tract, located southeast of Woodhenge and west of the Grand Plaza. The CABB Tract is situated north of two known borrow pits (Fowler's 5–5 and 5–6) and includes an additional, previously unidentified borrow pit. Using evidence resulting from our limited excavations and geomorphology cores, we examine how Cahokians engaged with the natural and the supernatural through earth-moving activities while contributing to the construction of the urban landscape. We explore the "doings" (after Fowles 2013) of building and shaping the landscape through the borrowing of earth, creation of low spaces, and layering of soils and special materials as a means of engaging with and relating to other social agents. Additionally, we consider practices of re-excavation into special buildings and deposits of pottery in borrow pits and buildings in this area of Cahokia to demonstrate the ways in which the supernatural intersects with daily life.

Bamford, Bree (University of Victoria)

[263] *Preliminary Vertebrate Faunal Analysis of Hup'kisakuu7a (93T): Results from 2015 and 2016 Excavations*

Excavations conducted at the site of Hup'kisakuu7a (93T), in partnership with the Tseshaht First Nation, unearthed a variety of fauna that merit zooarchaeological analysis. Unlike the major ancient village sites previously excavated, such as Ts'ishaa and Huu7ii, the shallow shell midden of 93T is representative of a small-scale site, potentially occupied over a long period of time, comparable to that of the aforementioned major sites. The faunal assemblage is small in comparison to those of major village sites and differs notably in its consequent composition. Data from two separate excavation seasons have been quantified by weight, number of specimens and volume excavated per cubic meter. The datasets have been integrated to assess intrasite temporal and taphonomic trends, as well as intersite variation. Analysis reveals discernible intrasite variation that is consistent with house floor deposits and associated midden refuse. Intersite comparisons indicate that the characteristics of Hup'kisakuu7a are unique and provide context within a larger archaeological understanding of subsistence practices in Barkley Sound. These results contribute to the ancient and continuous cultural history of the Tseshaht in the Broken Group Islands of Barkley Sound.

Bamforth, Douglas

[332] *Discussant*

Barnard, Hans [309] see Jones, Terrah

Bandeira, Arkley [45] see Colonese, Andre Carlo

Bánffy, Eszter

[95] *Adapting to Harsh Environment Resulting Changes in Culture That Led Toward a New Perception of the Outer World: The Birth of the Central European Neolithic*

In the sixth millennium BC, first farmers reached the area between south east and central Europe, soon spreading into central Europe. About the character and identity of these first farmers at the boundary area, a series of new research results is available. At the boundary, harsh environmental conditions made their long well-working subsistence system unstable, as the 'package' of farming and mainly sheep and shifted to cattle keeping. Yet, it

has hardly been investigated, what reflections of the changing character of nature and landscape caused in their minds. The paper gives two examples for the perception of the previously unknown, northern natural environment, resulting in changes in cognition. The first one is about settlements amid forested hills. A different perception of social arena evolved, the original clay architecture turned to wooden house structures. The second example focuses on monumental clay figural art: female upper bodies emerging from large podiums are found in domestic contexts. In the northern margins, females turn to horned cattle figures. This shift reflects a growing importance of cattle keeping that permeated in domestic ritual life. The new pattern, different social places created and changes of rituals affected their perception of the natural environment around.

Bankoff, Richard [152] see Hixon, Sean

Banks, Kimball (Metcalf Archaeological Consultants Inc. and Combined Prehistoric Expedition Fdtn), Linda Scott Cummings (PaleoResearch Institute), Signe Snortland (Combined Prehistoric Expedition Foundation) and Maria Gatto (Aswan-Kom Ombo Archaeological Project)
[229] *Turning the Desert Green: Reconstructing Late Paleolithic Vegetation at Wadi Kubbania, Upper Egypt*

Wadi Kubbania is the largest wadi extending from the Western Desert to the Nile in Upper Egypt. The Combined Prehistoric Expedition devoted four seasons in the late 1970s-early 1980s investigating Late Paleolithic (20,000–12,000 BP) settlement-subsistence in the wadi. The Expedition documented one of the most complete occupational sequences for this period in Upper Egypt. Because of excellent preservation, the Expedition was able to reconstruct the vegetation and identify floral resources exploited during the Late Paleolithic. In 2012, the Combined Prehistoric Expedition Foundation in collaboration with the Aswan-Kom Ombo Archaeological Project returned to excavate WK26, which dates to the end of the Late Paleolithic sequence, with the objective of continuing vegetative reconstruction and identifying exploited floral resources, applying recent technology. This paper addresses vegetation during and plant use in the Late Paleolithic and techniques for identifying such resources.

Banks, Paul (Archaeological Society of Jamaica)
[93] *Discussant*

Banning, Edward (University of Toronto)

[191] *Percolation Theory and the Effectiveness of Adaptive Sampling in Subsurface Survey*

Percolation theory, used mainly in physics and materials science, describes the behavior of interconnected clusters in spatial lattices, but is also relevant to an age-old problem in archaeology: how best to detect buried sites with subsurface testing. It can provide insights into adaptive sampling protocols applied to two-dimensional scatters of artifacts. Our research focuses on adaptive sampling's impacts on our understanding of underlying distributions of artifacts and sites in survey by shovel tests, augering, or coring. Does adaptive sampling improve our ability to detect and recognize sites? Does it help us define site's boundaries or estimate their sizes? Or do we risk defining "sites" that are simply a creation of the research method? We evaluate adaptive subsurface sampling and compare it to simple subsurface survey through simulation. This allows us to control for artifact density and clustering, size of artifact clusters, and orientation and spacing of the lattice. We also experiment with different versions of the method, varying, for example, the size or definition of the "neighborhood." The simulations and comparison to predictions based on percolation theory help us evaluate the utility of current survey protocols and to suggest improvements for future work.

[73] *Discussant*

Baquedano, Elizabeth (University College London, Institute of Archaeology)

[288] *Gold (Tumbaga) and Butterfly Symbolism*

When metals were introduced in Mesoamerica ca. AD 850 they were used with both utilitarian and decorative purposes. Copper artifacts were turned into fishing hooks, tweezers, or axes. However, silver and gold were mostly used in jewelry production. Several deities were fashioned in gold as well as animals associated with gods. They included pendants, nose-rings, necklaces, etc. Warriors were also depicted as pendants, and there are examples in discs too. The context where the objects have been found is particularly important. There are good examples of butterflies made to represent fertility goddesses and there are representations of warriors wearing pectorals in the shape of butterflies. This paper will focus on the symbolic importance of butterflies in warfare as well as in agriculture.

[288] *Chair*

Baquedano, Elizabeth [135] see Paris, Elizabeth H.

Barajas Rocha, María [225] see Favila, Mario

Barajas Rocha, María [225] see Sanroman, Adriana

Barba, Luis [13] see Mejía Ramón, Andrés

Barba, Luis (Universidad Nacional Autonoma de Mexico), Linda R. Manzanilla (Universidad Nacional Autonoma de Mexico), Agustin Ortiz (Universidad Nacional Autonoma de Mexico) and Alessandra Pecci (Universidad de Barcelona)

[274] *Residue Analysis of Plastered Floors and Function of the Rooms at Teopancazco, Teotihuacán*

Teopancazco is a neighborhood center at Teotihuacán. It was excavated in the framework of the project Teopancazco "Teotihuacán. Elite y Gobierno" directed by Linda R. Manzanilla between 1997 and 2005). Samples from the plastered floors of the compound have been analyzed at the Laboratorio de Prospección Arqueológica of the UNAM (Mexico) in order to understand the chemical enrichments of floors and the spatial distribution of activities. We show here the results of the analyses of the Xolalpan phase of the compound, integrating the information coming from the residue analysis and other archaeological evidence at the site, in order to provide a hypothetical reconstruction of the use of space.

Barber, Sarah (University of Central Florida)

[82] *The Symbolism, Use, and Archaeological Context of Masks in Formative Period Coastal Oaxaca, Mexico*

Mesoamerica has a long tradition of masking, as evidenced by representations of masked individuals, and the masks themselves, extending back to at least the Early Formative period. In the lower Río Verde valley of Oaxaca, evidence for masking exists throughout the precolumbian sequence, from the

earliest villages to Postclassic settlements. This evidence often consists of figurines depicting masked individuals or representations on ceramic vessels and carved stones. Recent excavations have also uncovered a small number of masks and mask fragments. In this paper, we focus on the early history of mask production and use during the Formative period (1900 BCE—CE 250). We discuss the symbolism and archaeological context of masks and their representations in other media such as figurines. We suggest that masks played an integral role in communal performances that likely also included music, dance, and oration. A means of bringing together people and the divine, masks in ancient Oaxaca (like masks in Oaxaca today) imply animistic and nagualistic aspects of Mesoamerican cosmology. These ancient masks shared broad similarities with those used elsewhere in Formative period Mesoamerica, including the incorporation of transformative capacities into relations of inequality and authority by the first centuries of the common era.

[82] *Chair*

Barber, Sarah [82] see Joyce, Arthur

Barbier, Brian (University of California, Santa Barbara)

[381] *Beads All the Way Down: Reassessing the Economics of Shell Bead Production on Santa Cruz Island*

Marine shell beads played an important role within broad interregional exchange networks in California for several millennia. Previous scholarship has demonstrated the relationship of shell bead production and exchange to increasing sociopolitical complexity in the Santa Barbara Channel region during the Late Period, ca. 900 BP. However, this relationship is less understood for earlier periods. Additionally, the morphologically-distinct bead types produced during the Late and preceding Middle and Early periods leave different signatures in the archaeological record. Through experimental replication of Olivella shell beads, I assess differences in bead production labor rates and debitage signatures for the predominant bead types produced during the Early, Middle, and Late periods. I compare these findings to the bead production patterns at CA-SCRI-236, a site on Santa Cruz Island that was occupied during all three time periods. Results suggest that previous interpretations are inconclusive: socioeconomic complexity as underwritten by bead production may have developed much earlier and may have experienced brief lulls during times of social or environmental stress. Analysis of the long durée at one location provides greater insight into the evolution of sociopolitical complexity in the region.

Barcelo, Juan (Universitat Autònoma de Barcelona) and Florencia Del Castillo Bernal (Centro Nacional Patagónico-Conicet)

[286] *The Emergence of Cultural Consensus in Hunter-Gatherers: Toward a Computer Model of Ethnogenesis in the Past*

In this contribution we present the results of a computer simulation of an "artificial society," implemented to understand how cultural identities and cultural standardization may have emerged in a prehistoric hunter-gatherer society as a consequence of restricted cooperation. The aim of the model is to explain how diversity and self-identification may have emerged in the small-scale societies of our prehistoric past. The computer model explores some possible consequences of theoretical assumptions about cooperation, communal hunting and cultural diversity and the process of ethnogenesis. We have not modeled the decision process from the point of view of individuals, but at the level of the population, modeling social dynamics as a set of factors that constrain social actions. The agent does not decide as a rational individual, but probabilities for action at each cycle are taken into account as soon as local conditions change. Computer results are then compared to ethnoarchaeological data from Patagonia to evaluate the explanatory capability of the theoretical model.

Bardolph, Dana (University of California Santa Barbara), Brian Billman (University of North Carolina, Chapel Hill), Jesus Briceno (Ministerio de Cultura, Peru) and Gabriel Prieto (Universidad Nacional de Trujillo)

[222] *Reconsidering Farming and Foraging in the Pre-Moche World*

This paper examines the relationships between food, identity, and social inequality on the Prehispanic Peruvian North Coast through a paleoethnobotanical perspective. We reconstruct household culinary practices to address the roles that food played in the migrant experience of highlanders that settled in a traditionally coastal river valley. This migration occurs just prior to the consolidation of the Southern Moche polity, one of the earliest state polities in the Americas and characterized by unprecedented social stratification. Regional subsistence reconstructions based on primary plant data from large-scale household excavations are now beginning to bear fruit. We consider changes in plant foodways during the Early Intermediate Period (400 BC–AD 1) through a diachronic analysis of macrobotanical data from highland and coastal residential sites in the Moche Valley, to explore how highland-coastal contact, competition and alliance formation, and a broadly changing sociopolitical landscape impacted plant food production at the household level. We aim to show how careful microscale research can complement the current studies of political, economic, and ideological phenomena at larger ceremonial centers, on the Peruvian north coast, in the Andes, and beyond.

Barker, Claire [34] see Fladd, Samantha

Barkwill Love, Lori (University of Texas at San Antonio)

[303] *Revisiting the Mogollon Early Pithouse Period*

The beginning of the Early Pithouse period in the Mogollon region, around AD 200, was marked by a fundamental shift in material culture and lifeways. This major shift included the introduction of ceramics and the construction of more substantial habitation structures as well as communal structures. Yet, relatively speaking, few Early Pithouse period sites have been excavated, and many of the sites that have been excavated were excavated 30 or more years ago. This poster presents new data from existing Early Pithouse period collections as well as the preliminary results of test excavations at Two Boots, an Early Pithouse period site excavated as part of the 2016 UTSA Southwest Archaeology Field School. The implications of these new data on our current understanding of the Early Pithouse period and directions for future research will be discussed.

Barlow, Robert (BAKOTA Project/University of Alabama), Hajnal Szász (Babes-Bolyai University), Györgyi Parditka (University of Michigan) and Paul R. Duffy (University of Toronto)

[196] *Spiraling Like a Boss: Exploring Elements of Bronze Age Ceramic Style at the Micro-Regional Level*

Fortified tell site excavations in the twentieth century formed the basis for construction of a Bronze Age chronology in the Carpathian Basin. Typological and stylistic elements observed on these sites were used to create archaeological cultures for large areas, whose distributions changed over time. However, the use of large archaeological groups obviously masks internal regional variation, both chronologically and stylistically. Different river-valleys, as micro-regions, may have formed the basis for regular interaction, community activities and social practices, and thus may have left distinctive material culture. In this poster we compare stylistic elements of four different micro-regional areas in Eastern Hungary during two Bronze Age cultural phases. We evaluate the possibility that the large culture area names "Ottomány" and "Gyulavarsánd" mask internal variation recognizable among the surface collection material for 17 sites in the Lower Körös Basin. By considering other settlement types as well, we also investigate whether fortified tell sites provide a representative picture of regional ceramic manufacturing practices.

Barnard, Hans (Cotsen Institute of Archaeology at UCLA)

[309] *Cultural Continuity along the Western Red Sea Littoral*

The study of the ancient cultural history of northern Ethiopia, modern Tigray, often includes an interpretation of the obvious connections with the Arabian Peninsula, to the east, and the Nile Valley to the west. Less attention is usually given to contacts with the African heartland, to the south, and the relatively arid region between the Nile Valley and the Red Sea, usually referred to as the Eastern Desert, to the north. The cultural connections with the latter are reflected in linguistic and material traditions (basketry, ceramics, headrests, etc.) and more recently in the central place of coffee in daily life. In this presentation the long-term cultural continuity along the western Red Sea littoral will be illustrated. Given the limitations of the data currently available, this will be from a theoretical and more or less anecdotal perspective.

Barnard, Hans [240] see Braekmans, Dennis

Barnes, Gina (Durham University)
[148] *Moderator*

Barnett, Kristen (Bates College)

[50] *Community Perceptions and Effects of the Bridge River Community Archaeological Project, 2012–2016*

The Xwisten (Bridge River) community has had an ongoing collaborative relationship with the University of Montana, exploring the archaeology of the Bridge River Village, site Eerl4. The latest series of inquiries at the Bridge River Village focused on the excavation of Housepit 54, a single, mid-sized, semi-subterranean pithouse with 17 anthropogenic floors from occupations spanning 1800 BP–ca. 1850s CE. The goal of this research is to explore the perceptions of the discipline of archaeology, the dissemination throughout the community of archaeological findings and scientifically held beliefs regarding Housepit 54 and the ancient village, and the impacts that this project has had within the Xwisten and surrounding communities, including consideration of existing differences in world views and belief systems. The final outcome of the research is intended to facilitate greater understanding of conducting community collaboration, provide an opportunity to better understand community needs and desires with regard to archaeological research, and allow the Xwisten Community a place to provide feedback and valuation with regard to the experiences had as of the end of the 2016 field season and the final excavations at Housepit 54.

Barnett, Kristen [257] see Skinner, Dougless

Baron, Joanne (University of Pennsylvania), Liliana Padilla, Christopher Martinez and Arielle Pierson (University of Pennsylvania)

[125] *Ceramics of La Florida-Namaan: A Preliminary Report*

The Guatemalan archaeological site of La Florida, located on the San Pedro River near the Mexican border, was home to the Classic Maya polity known as Namaan. Hieroglyphic inscriptions from La Florida and elsewhere reveal the polity's widespread political contacts with sites in western Petén, Tabasco, and beyond, as well as a dynastic history spanning three centuries. While known to archaeologists since 1943, the site has only recently been the subject of a multiyear research project. In this paper, we will present the ceramics recovered during the 2016 season of the La Florida Archaeology Project, our first season of excavations. We aim to explore, in this season and in future excavations, the role of La Florida in commercial exchange along the San Pedro and between Classic Maya communities in Petén and the Tabasco Plain.

Baron, Natalie (Trent University) and Gyles Iannone (Trent University)

[214] *Investigating the Religious Landscape of Epicenters in Preindustrial Tropical States*

The landscape of an epicenter has been built and modified to suit the needs of the people, both nonelite and elite. Epicenters consist of administrative, ceremonial, and residential features within a central precinct, often encircled by a moat or wall. Rulers of early tropical states would use religious propaganda to promote their power and legitimacy, which in turn created the purposeful and sacred design of the epicenter. By using the comparative method, this paper will examine the geographical relationship of the epicenter and the religious background of preindustrial state formations in South and Southeast Asia (800–1400 CE) and Mesoamerica (250–900 CE). This method will allow for a greater consideration of the similar characteristics exhibited by tropical states across different historical contexts. On-site visitations and an extensive literature review of the datasets place an emphasis on architectural features and the monumentality of the epicenter.

Barragán Montero, Antonio [326] see Gill, Lucy

Barrera Rodríguez, Raúl [252] see Medina Martínez, Lorena

Barreto, Cristiana (Museu Paraense Emilio Goeldi) and Helena Lima (Museu Paraense Emilio Goeldi)

[327] *Understanding the Dispersion of Ceramic Styles in the Lower Amazon: What Is Koriabo?*

Archaeologists working in the lower Amazon have been identifying a particular ceramic style with a vast regional distribution, including the Caribbean, the Guyanas, the Amazon estuary and, more recently, the lower Amazon floodplain. This paper will discuss the distribution and variability of this style in the lower Amazon, its correlation with Carib speaking groups, and the possible contexts, processes and practices that generated such dispersion.

Barrientos, Tomás [131] see Canuto, Marcello A.

Barrientos, Tomás [218] see Davies, Gavin

Barrier, Casey (Bryn Mawr College)

[278] *Towns and Household Groups during a Period of Urban Transition in Native North America: A Case from the Early Mississippian Era in the Cahokia Region*

The development of large, complex settlements and the organization of associated institutions and social groups are major topics of research for anthropological archaeologists. The realization that precolumbian inhabitants of the central Mississippi Valley instigated complex social arrangements at urban scales makes Native North America a site of research that can contribute to the comparative study of urbanism. In this paper, previous and ongoing work near the site of Cahokia is discussed. A program of research has been started that is examining demographic shifts associated with the

growth of large settlements during the period of urban transformations. As part of the process, an emerging view is one of social groups aggregating at various scales and creating complex arrays of communities, institutions, and settlements ranging from village, to town, to city. This view includes a real-time history of movements and constructions suggesting that these settlements were in flux, and that the sites and settlement "types" we study are a product of the dynamic urbanization process in the region. As a case study, the construction then rapid abandonment of an early mound-town by coalesced household corporate groups is provided that gives a rare look into one aspect of urbanism in this region.

Barrier, Casey [283] see Horsley, Timothy

Barrios, Edy (CUDEP-USAC)

[71] *Community Resilience in the Río Amarillo East Pocket: Commoner Occupation around Río Amarillo and Quebrada Piedras Negras at the end of Late Classic through Postclassic Periods*

Recent and ongoing research at residential groups at the sites of Río Amarillo and Quebrada Piedras Negras are providing a better understanding of the lives of commoners and of the population dynamics during the Late Classic through the Postclassic period in this area. These sites share the second-widest pocket of the Copan River Valley, and lie in the middle of one of the main trade routes between Copan and Quirigua. The excavations and mapping of the household groups distributed in this landscape provide an increased understanding of the people who inhabited this region close to the Copan metropolis during a time of complicated political, economic, and environmental change. Of particular interest are some of the differences found in the material culture of these sites, which all lie within the visual limit of each other. This paper will discuss both results of specific households and those of a larger mapping program.

[71] *Chair*

Barrios, Edy [71] see Capellin Ortega, Anarrubenia P.

Barse, William (Smithsonian Institution)

[220] *Orinoco Prehistory and Its Wider Relationships*

The archaeological sequence developed in the Upper Orinoco in the vicinity of the Atures Rapids has not only local continuity through time but exhibits broader relationships with northern South America. The earliest preceramic components in the region, dated to ca. 10,000 BP, can be linked to comparable occupations that have been documented in the Sabana de Bogota. Slightly later preceramic components represented by distinctive contracting stemmed projectile points show links to sites in central Brazil and to the El Inga related sites in Ecuador. The lengthy Barrancas Tradition and sequent Arauquin horizon also exhibit stylistic links to other ceramic complexes in northern South America. These ties through time will be examined and related to anthropological models of trade and exchange in northern South America.

Bartelink, Eric [30] see Gardner, Karen

Barth, Nicolas [329] see Stanton, Travis

Barton, Loukas (University of Pittsburgh), Baiyarsaikhan Jamsranjav (National Museum of Mongolia), Tuvshinjargal Turmubaatar (National Museum of Mongolia) and Christopher Morgan (University of Nevada, Reno)

[114] *Spatial Patterns of Human Land Use from Surface Collections in NW Mongolia*

The spatial distributions of artifacts from different periods of time reveal change in the nature and intensity of human activities in different kinds of places. This is particularly useful when trying to establish how patterns of human mobility and land use evolved during periods of dramatic environmental or economic change. The Uvs Nuur Basin of northwest Mongolia played host to both. Here, the distribution of glaciers, vegetation zones, and lake systems changed rapidly from the late Pleistocene through the early Holocene, encouraging novel adaptive strategies from humans and animals alike, while the adoption of an economy focused on domestic animals forever transformed the biota and stability of the landscape. Preliminary results of an intensive surface survey point to patterns of change in human mobility, interaction, and production in two distinct regions, providing unique insight on the prehistoric human ecology of the Uvs Nuur Basin and similar regions of northern central Asia, ca. 40.0—4.0 k BP.

[268] *Discussant*

Barton, Michael [38] see Bergin, Sean

Bartusewich, Rebecca (University of Massachusetts Amherst)

[132] *Understanding Interactions between Iron Age Polities in Cyprus through the Microscopic Lens*

This paper will address economic and political interactions of two Cypriot polities during the Iron Age prior to political transitions in about 450 BCE. Idalion is a polity in the interior, near the copper-bearing Troodos Mountains and Kition is a port town on the southern coast. These polities are separate by 20km of rolling hills and plains. By 450 BCE, Kition had obtained political control of Idalion, but there has been little research about these two urban areas interactions prior to this event. I have performed preliminary analysis of 100 thin sections to determine if in a mineralogically similar region one can differentiate between production locations and determine types of interaction. Using this data I have found that production characteristics such as the type clay processing, sieving, the speed of the wheel, and firing temperature were most informative. I applied a chaîne opératoire analysis to understand the way potters learn and adapt. Periods of stasis and change in production styles over several hundred years suggest a long-time relationship between the two localities, long before one politically overtook the other.

Bar-Yosef, Ofer (Harvard University)

[33] *Early Cultivation in China: Where and When*

For over 2.6 million years foragers did not demonstrate that cultivation was a way for obtaining food stability although occasional events may have escaped the archaeological records. Cultivation by hunter-gatherers across the continents (except for Australia) emerged during the Terminal Pleistocene and early Holocene as a response to limitation on mobility due essentially to competition among growing populations conceived archaeologically as "relative demographic pressure." The paper will consider the impacts of the loss of a major land due to the Pacific sea rise and Holocene environmental and social fluctuations in North and South China as triggers for millet and rice cultivation. The hypothesis concerning "where" and "when" in the Chinese mainland will be discussed based on current evidence.

Bar-Yosef, Ofer [213] see Patania, Ilaria

Bar-Yosef Mayer, Daniella (Tel Aviv University)

[338] *Early Upper Paleolithic Shell Beads and Shellfish from Manot Cave, Israel*

The Early Upper Paleolithic (EUP) cave site of Manot, western Galilee, Israel yielded remains of the Ahmarian and Levantine Aurignacian technocomplexes. The malacofauna assemblages from the two technocomplexes were analyzed (NISP=1180). Dozens of ornamental shells, mostly deriving from the Aurignacian assemblages, include perforated *Nassarius gibbosulus*, *Columbella rustica* and *Antalis* spp. as well as two cowrie beads found in association with human bones. The comparison of the Manot assemblage to the few published Levantine Early Upper Paleolithic shell assemblages reveals Aurignacian trends characteristic of circum-Mediterranean shell beads. Further research is necessary in order to characterize the Ahmarian shell assemblage. Edible mollusks include *Patella caerulea* and *Phorcus turbinatus* from rocky Mediterranean shores and Levantine land snails found as a shell midden. Mollusks were collected from the immediate vicinity of the site and from the nearest Mediterranean shore, about 15 km away. The consumption of shellfish and snails also represent an EUP trend characteristic of the Mediterranean region.

Barzilai, Omry (Israel Antiquities Authority)

[338] *The Dan David Expedition to Manot Cave: 2010–2016*

Manot Cave is a unique relict karst cave located in the western Galilee, Israel. The cave was inhabited from the Late Middle Paleolithic through the Early Upper Paleolithic periods until its main entrance collapsed some 30 thousand years ago. The cave consists of an elongated main hall and two side chambers. The topography of the main hall is composed of a long steep talus (ca. 30 m long) inclining from the original entrance of the cave to the center; a leveled area at the lowermost point of the main hall; and a smaller talus inclining from the eastern end of the cave. Seven excavation seasons (2010–2016) have been conducted so far at the Cave. The excavations revealed dense accumulations of Early Upper Paleolithic deposits by the cave entrance (Area E), at the center (Area D), at the base of the western talus (Area C), and at the leveled area (Area A). The aim of the symposium "In search for modern humans at Manot Cave" is to present the most updated interdisciplinary studies on Manot Cave which provide insights to the culture and environments of the Early Upper Paleolithic populations in the Eastern Mediterranean region.

[338] *Chair*

Barzilai, Omry [338] see Abulafia, Talia

Barzilai, Omry [338] see Goder Goldberger, Mae

Barzilai, Omry [338] see Sarig, Rache

Barzilai, Rebecca (Indiana University, Bloomington), Susan M. Alt (Indiana University) and Timothy R. Pauketat (University of Illinois)

[283] *Pottery and Religion at Greater Cahokia's Emerald Acropolis*

Since 2012, large-scale survey and excavations at and around the Emerald site east of Cahokia have investigated the religious foundations of the rise of that American Indian city. Emerald was a shrine complex, where religion was performed by Cahokians and pilgrims beginning around AD 1000. Excavations have revealed dense stands of nondomestic, ceremonial and public architecture alongside seemingly temporary, short-term housing. A prominent aspect of the rituality of the place was the use of pottery, possibly produced primarily on site. We consider the contexts and metrics of the Emerald ceramic assemblage in light of other indications of the vibrancy of earth and earthen plasters. The ceramic assemblage is then compared to Cahokia and contemporaneous assemblages from the region, highlighting the singular qualities of this most unusual religious destination.

Basanti, Dil (Northwestern University)

[309] *Network Approaches to Cosmopolitanism in Ancient Ethiopia (50–700 AD)*

This paper looks at how ideas of cosmopolitanism can be applied to the African context using Aksum (50–700 AD) in northern Ethiopia as case study. While there is much interest in issues of cosmopolitanism, or the making of a "world citizen" or a "world community" as drawn from eighteenth- to nineteenth-century conceptualizations, such issues become difficult to study on the African continent given the strong emphasis on personhoods configured around local, corporate contexts. Burial practices from ancient Aksum demonstrate particularly strong corporate personhoods, even while the kingdom was engaged in extra-local trade. Instead, using network theory, this paper looks at how the social dynamics implied by Aksumite burial practices would configure Aksum's regional connections across Tigray. In doing so, this paper seeks to understand what African case studies tell us about cosmopolitanism, and how these understandings highlight a wider range of ways that societies may be cosmopolitan.

Basiran, Alper and Cevdet Merih Erek (Gazi University)

[90] *The Earliest Architectural Remains in Anatolia*

The occupation of man has played an important role on cultural innovation; at the same time this process has always been a requirement of daily life for generation continuity. Since the start of human life history, choosing of places for occupation species has had different features. For example, the cave or rockshelters were preferred by Paleolithic man and they have hot style caves and/or shelters due to the period; this developed in Pleistocene climatologic conditions that were cold because of glaciers on the earth. At that point, we have to take a look at the transitional periods such as the Epi-paleolithic. In 2016, different architectural remains obtained in Direkli Cave which is located on the slopes of Delihöbek Mountain in Central Taurus, Kahramanmaraş. Direkli Cave occupation has been described as part of the Epi-paleolithic period, and especially by Natufian Culture. Basically, Natufian culture contains pre-farming components such as geometric microliths, circular structures in caves (as in Hayonim Cave), axes and some traces of domestication. At that point, we can say that there are close relationships between settlement and/or occupational development and the origin of architecture in human life.

Bassett, Christine (University of Alabama)

[223] *Chair*

Bassett, Hayden [161] see Norman, Neil

Basso, Diego Martin [222] see Albeck, María

Bates, Brian (Longwood University), Walter Witschey (Longwood University), Craig Rose (Longwood University), Mary Farrell (Longwood University) and Erin West (Longwood University)

[224] *The Library Is on Fire, Now What? Assessing the Damage and How to Approach It: A Case Study from the Chesapeake Bay*

The Chesapeake Bay, one of the largest marine estuaries in the world, serves as a microcosm of the forces of shoreline environmental change such as sea level rise, land subsidence and erosion and the impacts that such change has on the archaeological record. Using shoreline analysis, empirical observations and predictive modeling of four counties along the Bay, this project seeks to establish an understanding of the impacts on known archaeological sites in the study area as well as to assess potential high-probability site locations. The resulting data can be employed by government agencies, policy-makers, conservationists and others to determine the threat level posed by environmental change at the shoreline, thereby empowering informed decision-making about the allocation of resources to address the most urgent needs first.

Bates, Lynsey [317] see Galle, Jillian

Batist, Zachary [22] see Carter, Tristan

Batten, David C. [307] see Wilson, Michael

Battillo, Jenna (Southern Methodist University)

[229] *Paleofecal Analysis from a Human Behavioral Ecology Perspective*

Paleofecal research has benefited from many recent methodological advances, such as SEM and high-throughput DNA sequencing. However, as our results grow both more robust and more precise, our interpretations have not always followed suit. Researchers are eager to establish what was on the menu, but often more cautious in exploring the biocultural and evolutionary implications of those findings. Some scholars have argued that it is difficult to apply human behavioral ecology (HBE) models to archaeological data due to its incomplete nature. Although as Tim Riley (2012) points out, paleofeces represent a set of a single person's subsistence choices within a constrained time period, making them an ideal vehicle for the application of diet-breadth and other optimality models. This presentation will address how paleofecal analysts can apply HBE models to discern subsistence choices and provide a theoretical base for understanding the motivations for those choices. To that end, I will use examples of paleofecal research from the American Southwest, including my own work applying diet-breadth and patch-choice models to the analysis of 44 Basketmaker II period paleofeces from Turkey Pen Ruin, Utah.

Batty, Sylvia (Institute of Archaeology, NICH), Rebecca Friedel (University of Texas at San Antonio) and Leah McCurdy (University of Texas at San Antonio)

[7] *To the Mountain: Heritage Preservation through Archaeological Literacy in San Jose Succotz, Belize.*

Maya archaeology has seen a steady shift to the integration of community heritage interest and ownership in the design, execution and outcomes of research and preservation efforts. This poster describes a heritage outreach project focused on archaeology literacy development among grade school children in the community of San Jose Succotz, Belize, adjacent to the Xunantunich archaeological reserve. We authored a fully illustrated book entitled *To the Mountain* (2016) for the Succotz community, incorporating information on two sites that have been extensively investigated with the assistance of Succotz community members. *To the Mountain* is written in English, Spanish, and Yucatec, the three main languages spoken in Succotz. We distributed one copy of the book to each grade school child and made an eBook available online for download. By monitoring the use of this book by educational institutions and community members the changing perceptions of heritage and the effectiveness of heritage preservation through literacy campaigns can be established and observed. We expect that the familiar concepts in the book will make it an ideal educational tool for history and language education. We hope it will foster a culture in which Maya ancestry and language are not points of shame or social stigma.

Batun-Alpuche, Adolfo I. (Universidad de Oriente), Maia Dedrick (University of North Carolina at Chapel Hill) and Patricia McAnany (University of North Carolina at Chapel Hill)

[280] *Identifying Farming Strategies within Changing Regional Contexts at Tahcabo, Yucatán*

Colonial- and national-period studies of agricultural practices in Yucatán can provide useful case studies to address current theoretical concerns in political ecology. Perspectives on livelihood strategies today are broadly comparable to household-level studies of economic activities accessible through archaeology, especially given historical archaeology's attention to market integration and technological innovations. The time depth available through archaeological study complements contemporary analyses that address decision-making processes and the connections between global and local phenomena. In particular, archaeological study may contribute perspectives on the possible outcomes, sustainable or otherwise, of specialized and intensive production. This presentation examines Colonial-period strategies based on evidence from two contexts at Tahcabo: households and rejolladas (limestone solution sinkholes that contain deep soils). Given the sociopolitical, environmental, and demographic dynamics known to have existed at the time, we consider farming choices and their implications for risk management and long-term sustainability.

Batun-Alpuche, Adolfo I. [36] see Dedrick, Maia

Bauer, Alexander (Queens College, CUNY) and Owen Doonan (California State University Northridge)

[265] *The Black Sea as a Fluid Frontier: Connectivity, Integration, and Disarticulation from the Fourth to First Millennium BCE*

Recent years have witnessed increasing scholarly attention to the Black Sea, a region often considered peripheral to better known "cores" of cultural activity, such as the Mediterranean, Europe, the Near East, and even the Caucasus. Challenging conventional views of the Black Sea as largely disarticulated prior to the arrival of Greek colonists in the seventh century BCE, this paper argues that ongoing, informal networks of interaction existed across the region during the previous millennia, networks that both facilitated and challenged later colonial and imperial processes. Presenting a technological study of pottery from recent investigations at the Black Sea coastal site of Sinop, Turkey, and other Black Sea coastal contexts, this paper presents the argument that the appearance of shared traditions may both reflect and have served to reinforce an emergent "Black Sea" identity at different phases in the region's prehistory, suggesting that alternating cycles of integration and dis-integration waxed and waned across Black Sea networks of connectivity over the millennia. It is hypothesized that these phases occurred in response to broader interregional dynamics of connectivity between the Near East, southeast Europe, and the Mediterranean.

Bauer, Andrew (Stanford University) and Erle Ellis (University of Maryland, Baltimore)**[242]** *The Anthropocene Divide: Obscuring our Understanding of Socio-Environmental History*

Much scientific debate has focused on the timing and stratigraphic signatures for the Anthropocene. In this paper, we argue that strident debate about the Anthropocene's chronological boundaries arises because its formal periodization necessarily forces an arbitrary break in a long history of human alteration of environments. The aim of dividing geologic time based on a "step-change" in the global significance of socio-environmental processes goes directly against the socially differentiated and diachronous character of human-environment relations. The environmental outcomes of human actions are not the coordinated synchronous product of a global humanity, but rather result from heterogeneous activities rooted in situated sociopolitical contexts entangled with material difference. Thus, the Anthropocene periodization, what we term the "Anthropocene Divide," obscures rather than helps understandings of long-term human environmental relationships and the social and political contexts of their production.

Bauer, Andrew [167] see Johansen, Peter

Bautista, Stefanie (Stanford University), Justin Jennings (Royal Ontario Museum) and Willy Yépez Álvarez**[170]** *Untangling Wari Colonization, Trade, and Administration in Coastal Arequipa from the Site of Quilcapampa, Sigüas Valley*

The seventh century AD marked a period of great social change in the coastal valleys of Arequipa, Perú. During this time, an increase in violence, population growth, and social complexity was met with foreign influences from the Wari state of the central highlands. While scholars have long asserted that Arequipa fell under Wari control at this time, the evidence for direct state control has never been demonstrated conclusively in the region. This presentation reports the results of our excavations at the monumental center of Quilcapampa, located in the Sigüas Valley. Quilcapampa had long been called a Wari administrative settlement, but until now has remained poorly understood. Our excavations reveal that the site began, and was briefly occupied, in the mid-ninth century. Moreover, architectural patterns and material culture demonstrate that individuals who built and occupied this site used a combination of Wari and local styles and practices. The data suggests that Wari settlers may have built Quilcapampa, and founded on and oriented around a major coastal transportation route. However, it still remains unclear based on the recovered data what administrative function and role the state played—if any—in the functioning of the settlement and in the region in general.

Baxter, Erin (University of Colorado, Boulder)**[373]** *Aztec at the End of Days: Great House to Crossroads*

New investigations of primary source material reveal that the final days of Aztec were extensively recorded (but not published) by Earl Morris. This paper will present analyses of burial, feature, architectural and artifactual data that indicate a chaotic and tumultuous end at Aztec preceded by behaviors that differed drastically from Chaco Canyon or in other twelfth century great house sites. These practices are seen in mortuary data, in room remodeling the increased frequency of habitation of rooms, and the notable conversion of Chacoan rooms to both mortuary and trash-fill contexts. Finally, while some great house rooms burned on small scales, Aztec burned catastrophically. This destruction coincides with upheaval in the adjacent Mesa Verde region, which also experienced high levels of violence, and trends toward aggregation followed by migration and regional depopulation. I will argue that data indicate skewed sex ratios, unrecognized high status individuals, violence—particularly toward women and children—the practice of witchcraft, and that evidence of remodeling and final destruction of Aztec precipitated upheaval at the end of the Chacoan system and the conversion of the site to a refugium during the depopulation of the Mesa Verde region.

[315] *Discussant***[373]** *Chair***Baxter, Jane (DePaul University)****[172]** *Emotional Practice and Perspectives on Emotion in the Archaeology of Childhood*

Childhood is a stage of life that engenders particularly empathetic and emotional responses from people, and those reactions affect how the topics of children and childhood are perceived, impact the individual(s) conducting research, and shape the ways we think about children as subjects. This paper is a wide ranging exploration of my experiences in the archaeological study of childhood, which includes both the role of emotion when interpreting childhood in the past and the emotional contexts of practice when doing the archaeology of childhood. This topical approach will be used to think more broadly about how emotions can enter into archaeological research in ways that both respect material evidence and the humanity of archaeologists and those they study in the past.

Baxter-McIntosh, Jill, Crystal C. Glassburn (Northern Land Use Research Alaska, LLC), Robert C. Bowman (Northern Land Use Research Alaska, LLC) and Morgan R. Blanchard (Northern Land Use Research Alaska, LLC)**[257]** *Tales from the Trench: An Analysis of Artifacts Salvaged from Two Western Thule Sites in Kotzebue, Alaska*

Monitoring and salvage archaeology is often viewed as an anathema to the archaeological record. Nevertheless, both situations frequently occur within CRM contexts. Here, we present analyses of lithic material, organic tools, pottery, and fauna from two subsurface house features in Kotzebue, Alaska. Radiocarbon dates indicate that the two sites are roughly contemporaneous, dating to the end of the Medieval Warm Period, and are associated with the Western Thule tradition. The materials were recovered during trenching activities for a fiber-optic cable and retain little provenance integrity. However, we argue that the analysis of "salvaged" artifacts, even without ideal stratigraphic or spatial information such as these, can be informative for the archaeological record and CRM companies should encourage contractors to support analysis and research that can contribute to knowledge at both the local and academic level.

Bayham, Frank (California State Univ., Chico) and Kasey Cole (California State Univ., Chico)**[383]** *Territoriality, Intertribal Boundaries, and Large Game Exploitation: Empirical Evaluation of a Spatial Bioeconomic Model of Conflict in the Western U.S.*

Being a high-ranking prey item, large game are often desired for their economic and prestige values, both of which may be converted to an individual's status. As such, big game can serve as a potential axis for competition between linguistic or ethnically distinct groups particularly under conditions of population stress leading to resource depression. This dynamic has been modeled using an evolutionary ecological approach that combines an amalgam of standard foraging models with the added cost of intergroup conflict (Bayham and Bayham 2016). This study identifies several archaeological correlates of the model and explores its empirical applicability and testability in various areas of western North America. We specifically focus on localities in northern California and adjacent regions which utilize large artiodactyls, have conflict with neighboring groups, and buffer zones. Preliminary results are promising and we suggest the model may prove beneficial in the construction of regional research designs.

Bayham, Frank [251] see Cole, Kasey

Bayman, James**[129]** *From Hohokam Archaeology to Narratives of the Ancient Hawaiian "State"*

The analysis of material correlates to interpret cross-cultural variation in ancient political economies is a conventional and time-honored tradition in world archaeology. The material correlates that archaeologists use to gauge degrees of social stratification include evidence of subsistence intensification, hierarchical settlement patterns, craft specialization, large-scale monumentality, and differentiated mortuary programs. Ironically, recent claims for the rise of ancient states in the Hawaiian Islands confound prevailing models of political economy among the Hohokam in south-central Arizona. My comparison of Hohokam and Hawaiian archaeology reveals that although their material records were comparable in scale, many archaeologists have concluded that Hohokam society (unlike Hawaiian society) was governed by a marginally stratified non-state political economy. These findings challenge anthropological archaeologists to ponder the theoretical ramifications of relying on material correlates to construct cross-cultural models of ancient political economies.

[84] *Chair*

Bayman, James [335] see Fish, Paul

Bazaliiskii, Vladimir Ivanovich [330] see van der Haas, Victoria M.

Beach, Timothy (University of Texas at Austin), Sheryl Luzzadder-Beach (University of Texas at Austin), Colin Doyle (University of Texas at Austin), Nicholas Dunning (University of Cincinnati) and Nicholas Brokaw (University of Puerto Rico)**[83]** *The Critical Zone Revolution from 2016 Lidar and Two Decades of Multi-proxy Geoarchaeology around the Programme for Belize*

Over the last two decades we have studied agroecosystems in the Programme for Belize (Pfb), a valuable and privileged reserve for an exceedingly wide array of research efforts. Aspects of the agroecosystems preserved in the Pfb include terraces, wetland fields, aguadas, ecology, and curious wall features under the canopy of this tropical forest with some savannas. We based these studies on excavations along multiple transects across this karst region's uplands, escarpments, bajos, floodplains, and terraces and on hundreds of soil and water chemistry analyses. This paper appraises these excavations and their findings in light of a new, 300 km² swath of lidar that covers each of these landscapes in the Pfb and its surroundings, especially the Blue Creek area. We focus on three main topics based on our 2016 field and remote data that reflect these decades of study: wetland fields, agricultural terraces, and soil-human forest interactions. The lidar imagery shows us new evidence for wetland field systems, terracing, and the critical zone (from rock to soil to forest to the lower atmosphere), which creates unprecedented resolution on this remarkably florid region's history of human and landscape interaction.

Beach, Timothy [83] see Luzzadder-Beach, Sheryl

Beaubien, Harriet "Rae" (Smithsonian/Museum Conservation Institute)**[276]** *Field Conservation of Skeletal Remains: Techniques, Materials, and Implications for Future Analysis*

The information potential of skeletal remains—as for any excavated material—is impacted by the conditions of archaeological burial, and the environments and actions encountered during subsequent excavation, laboratory processing, study, and storage. A conservation approach emphasizes the mitigation of threats to material stability and integrity, which for excavated collections are often most critical at the point of archaeological exposure and recovery. Techniques and materials in use by conservators for stabilizing, lifting, and providing protective housings for skeletal remains in the field are discussed, using case examples primarily from terrestrial archaeological projects in Mesoamerica. Implications for the use of various modern synthetic consolidants and adhesives will be included, based on results of recent experimental work carried out at the Smithsonian's Museum Conservation Institute examining their effects on results of biomolecular instrumental analysis of skeletal material.

[392] *Discussant***Beaudoin, Ella (American University), David R. Braun (George Washington University) and Jonathan S. Reeves (George Washington University)****[153]** *Tool Use across Space in the Middle Pleistocene: Novel Techniques of Edge Damage Analysis at Elandsfontein, South Africa*

Although studies of lithic technology have been ongoing for over a century our knowledge of what tools were used for is still poorly resolved. Detailed analysis of microscopic damage has been the major focus studies of tool use. However, these studies are often limited to a subset of tools that have not undergone postdepositional damage and can be studied microscopically. Recently new approaches to damage patterns on the edges of simple flaked tools have been used to develop assemblage scale analyses of tool use in a variety of Paleolithic contexts. Here we apply these techniques to a large assemblage of stone artifacts from multiple excavations at Elandsfontein (1 Ma—780Ka) from the Western Cape of South Africa. We incorporate experimental tool use to develop possible hypotheses about what certain patterns of damage represent. Measures of damage location, continuity, and extent provide intriguing insights into the variability in tool use patterns. Results indicate that tool use patterns are largely heterogeneous across a relatively large landscape. This research was supported by the National Science Foundation Research Experience for Undergraduates (NSF-BCS-1620907).

Beaudoin, Ella [259] see Peixotto, Becca

Beauval, Cédric [85] see Boileau, Arianne

Beaver, Joseph (University of Minnesota Morris)**[342]** *Grave Markers of Infant Burials in Historical Cemeteries in West-Central Minnesota*

Roughly one in eleven individuals buried in historic-period cemeteries in Stevens County, Minnesota, died before reaching one year of age. This paper examines the grave markers of a subset of the 913 infants buried between 1870 and 1970, looking at both chronological and contemporary variation in style, production, and information recorded. Explanatory factors examined include religion (using the cemetery of burial as a proxy), evidence of associated maternal mortality, and when available, documentary evidence of parental socioeconomic status, ethnic origin, other children, and so forth.

Bebber, Michelle

[342] *A Petrographic and Material Science Approach to Understanding Temper Selection in the Prehistoric Ceramic Sequence of the Scioto River Valley, Ross County, Ohio*

This research elucidates the complex nature of pottery tempers used in the Scioto River Valley of south central Ohio. The data suggest that during the Late Prehistoric Period indigenous potters began using composite temper types with concretionary hematite as a secondary temper—most often found alongside shell as the primary temper. This project involved two phases: 1) petrographic research and 2) mechanical properties testing. The initial research phase involved a detailed analysis of the clay matrix using polarized light microscopy. Precise temper densities were determined using point counting procedures. The second phase involved the production of test samples based on the petrographic data, followed by compressive bend testing of the experimental samples. The test samples were evaluated for mechanical strength, fracture toughness, and rate of thermal expansion. It was shown that hematite tempered samples exhibited significantly higher strength values—however, these samples fractured in a catastrophic manner signaling low post-peak toughness. The shell tempered samples exhibited the weakest strength values—however, they exhibited the most elasticity and most resistance to post-peak fracture. Based on the data, it is suggested that these two distinct temper types were being used in complement.

Becerra, Gibrán

[10] *Las Huellas del Poder: Estrategias políticas en el este de Los Tuxtlas, Ver.*

El ejercicio del poder en Mesoamérica puede ser medido y estudiado de diferentes formas. Una de estas formas tiene que ver con los despliegues políticos ligados a los programas arquitectónicos y las estrategias políticas implementados a partir de estos elementos. En este trabajo se pretende mostrar de forma visual los resultados de un estudio que evaluó la centralización del trabajo de la arquitectura pública como un índice de poder político.

Becerra Alvarez, Marimar (Universidad Veracruzana)

[10] *Sistemas de almacenamiento en un puerto prehispánico: Consideraciones generales*

Un sitio con características portuarias, en el cual se da una dinámica de un flujo constante de bienes, personas, información, etc., no sólo necesita captar y distribuir, sino también cerciorarse de la preservación de dichos bienes. En este panorama, los sistemas de almacenamiento son eje fundamental, ya que preservan los bienes hasta el momento en que son requeridos por el usuario final, lo que implica que los sistemas de almacenamiento deben estar organizados y estructurados para coincidir con los objetivos del consumo.

Beck, Charlotte (Hamilton College) and Amanda Taylor (Pacific Lutheran University)

[51] *Bear Creek and the Pacific Northwest Western Stemmed Tradition*

The lithic assemblage from Bear Creek (45KI839), a late Pleistocene-early Holocene site in King County, Washington, is representative of the Western Stemmed Tradition (WST), likely the oldest lithic tradition in most areas west of the Rocky Mountains. It is followed in the Pacific Northwest by the Olcott Tradition. Although some argue that Olcott represents an intrusion from Alaska, archaeological evidence supports in situ development from the WST. In the Great Basin the WST is biface oriented, represented by a relatively standardized reduction sequence present in assemblages across that region. On most of the Columbia Plateau, however, the WST appears to be a core and flake/pseudo blade technology, which is well suited to the reduction of tough, coarse-grained materials so prevalent in that area. Biface reduction is only one of several core reduction strategies represented in the Bear Creek assemblage; others include multidirectional unpatterned, centripetal, and unidirectional core reduction. In this poster we demonstrate that the Bear Creek assemblage identifies more closely with the core and flake/pseudo blade strategy of the Columbia Plateau than the biface-oriented strategy of the Great Basin.

Beck, Jess (University of Pittsburgh—Center for Comparative Archaeology)

[139] *Post-Mortem Manipulation, Movement, and Memory in Copper Age Iberia*

Post-mortem manipulation of human remains played a critical role in mortuary practices in Copper Age Iberia (c. 3250–2200 BC). During this period in Spain and Portugal, individuals were buried communally in tholos-type tombs, as well as natural or artificial caves and rockshelters. Evidence from across Iberia suggests that mortuary practices included the manipulation and movement of previously interred bodies, either in order to clear space for new individuals, or to facilitate secondary reburial in new locations. I focus on evidence from the site of Marroquíes Bajos (Jaén, Spain), which at 113 ha is one of the largest villages known for the Iberian Copper Age. Marroquíes contained at least seven different mortuary areas, and shows evidence of multiple funerary processes, including secondary burials and communal burial in mortuary structures or artificial caves. The latter two treatments suggest that at specific points in time, members of the community came into repeated and deliberate contact with human remains. By contextualizing Marroquíes Bajos mortuary practices within a broader regional pattern of post-mortem manipulation across the Iberian Peninsula, it is possible to explore the ways in which these mortuary practices influence the construction of communal and individual identities in Copper Age societies.

Beck, Robin [283] see Horsley, Timothy

Becker, Hilary (Binghamton University)

[132] *Branding the Mediterranean: Naturally-Sourced Products and Their Containers in Greece and Rome*

The ancient trade in olive oil and wine is well understood thanks in no small part to typologies established for their transport containers. A synthetic survey of the containers used to transport other naturally-sourced products, such as pharmaceuticals, perfumes, and pigments, is lacking. Such products were subject to counterfeiting and adulteration in antiquity, thus packaging and labeling were often valuable tools for ancient consumers to help them recognize products. For example, the astringent lykion, when sourced from India, was recognizable because it was transported in leather bottles, made of either camel or rhinoceros skin. A locally produced lykion from Sicily was instead put in distinct jugs, some of which were labeled with the drug's name and the name of the druggist. In both cases, a consumer was given clues to help identify the product's origin, which could serve as a guarantee of quality. Containers for herbs, pigments, and perfumes, as well as surviving examples of labeled products themselves, facilitate our understanding of how naturally-sourced products traveled (often at great distances). Exploring this system not only broadens our understanding of the trade in naturally-sourced products, but also provides insight into what an ancient consumer would have known at the marketplace.

Becker, Rory (EOU), George Holley (Minnesota State University Moorhead) and Jakob Jensen (University of Utah)

[375] *Use of Ultraviolet Imaging to Enhance Analysis of Incised Stone Artifacts*

Monochrome ultraviolet (UV) photography provides a new method in the analysis of incised imagery on stone artifacts. In this study, the technique is used to enhance the interpretation of figures on a collection of finely incised catlinite tablets from the Red River Valley of Minnesota and North Dakota. The nine hand-sized tablets included here are commonly associated with the Oneota tradition, although these display designs rooted in Plains themes. These tablets are ideal for the method as they bear multiple, sometimes overlapping, incised designs that are subsequently marred by scratching/cutting. A comparison of traditional methods with the monochrome UV imagery shows a high level of detail in the UV photography that is not

readily discernible using traditional methods. Marks and incised lines visible in the UV imagery but not visible in the color photography, or to the aided or unaided eye, inform both the manufacture process and interpretation of figures identified on the tablets.

Becker, Sara (University of California, Riverside)

[92] *Osteoarthritis in Hands, Feet, Spine, and Temporomandibular Joint from Individuals Buried at Tiwanaku Sites in Moquegua, Peru*

This study evaluated evidence of osteoarthritis in the multiple joints of the wrist and hand (ulnae, radii, carpals, and metacarpals, finger phalanges), ankle and feet (tibia, tarsals, metatarsals, foot phalanges), spine (cervical, thoracic, lumbar vertebrae), and temporomandibular joint from human skeletal remains previously excavated from Tiwanaku sites within the Moquegua Valley of Peru (AD 500–1000). Osteoarthritis, a type of degenerative joint disease with a complex etiology, has been shown to occur in situations where movements are repeated frequently enough to damage joint surfaces. This skeletal condition was used to understand patterns and levels of activity from five Tiwanaku colony sites (M1, M10, M11, M43, M70). Data were collected from older juveniles and adults ($n = 183$), cross-evaluated by age-at-death and sex, and preliminary results show differences, especially in hands, feet, and spine, between individuals from these sites. In addition, evidence of osteoarthritis in the temporomandibular joint, especially among younger folk, may be related to artificial cranial modification. Overall, these results support the idea that the site groupings represent spatial differences in occupation and that repetitive labor likely began among older subadults (10+ years) in the prehistoric Andean culture of Tiwanaku.

Becks, Fanya (Stanford University)

[172] *Archaeology as Meditative Practice*

In this paper I will illustrate how my research praxis necessarily altered as a product of close collaboration and consultation. The Muwekma Tribe of the San Francisco Bay Area (California, USA), is a community that has been eager to engage with respectful researchers in the analysis of their ancestors remains, once they have been disturbed. As a non-indigenous researcher collaborating with the tribal community, aspects of proper respect and care toward ancestors, and materials associated with them, in the form of focus, love, respect and acknowledgement, have been integral in my engagement with plant remains from ancestral Ohlone graves. The ethics of calm, careful, and one pointed focus throughout material analyses have deeply altered the way that I have engaged with archaeological materials, and have illustrated a necessity to transcend secular and materialist ontologies when interacting with, and thinking about, Muwekma's ancestral heritage.

[291] *Discussant*

Beckwith, Laurie (Douglas College)

[270] *A Late Formative Period Site in Chimborazo Province, Ecuador*

Compared to the coastal areas of Ecuador, the central highlands of Ecuador are not well-known archaeologically, especially for the Formative Period. This paper will report on preliminary survey and excavation research carried out in the Chibunga River Valley, to the south of the modern city of Riobamba, during the 2009 and 2012 field seasons. Test excavations were carried out at the site of Collay, located on a mesa at 3,100 masl, to obtain a sample of material culture and material for dating. The site produced a series of Late Formative Period radiocarbon dates and evidence of a well-developed ceramic tradition that while unique to the site, shows a clear relationship to coastal Late Formative Period ceramic styles and to those from Cerro Narrio to the south. In addition the presence of exotic materials, such as spondylus, obsidian and green and alabaster-like ground stone bowls, demonstrates the site's participation in substantial trade networks. Finally, the location of the site in relationship to nearby mountains and the presence of standing stones with pecked bowls are suggestive of the ritual nature of the site.

[270] *Chair*

Bedford, Stuart (Australian National University)

[36] *The Archaeology of Colonialism and Capitalism in the Southwest Pacific: The Compagnie Calédonienne Nouvelles-Hébrides (CCNH) on Malakula, Vanuatu*

Much of the European mapping of the South West Pacific occurs relatively late in terms of global history. In Vanuatu (ex New Hebrides) the first visits were Spanish ships in 1606. The wider archipelago was not further explored until the visit of Cook in 1774 but soon afterward it had been incorporated into the rapidly infilling global map. The geography, climate and people had been described as had hints of the economic potential and the islands could now be discussed and dissected among the parliamentarians, business houses, proselytizing churches and learned societies of Europe and beyond. The tentacles of global capitalism, intertwined with colonial and missionary encroachment were soon to follow. One of the early drivers of European encroachment, and its associated introduction and distribution of exotic wares and technologies, plants and animals and disease was the Compagnie Calédonienne Nouvelles-Hébrides (CCNH). This paper outlines how archaeology can contribute to the understanding of this period in this region which saw radical change to traditional societies over a relatively short time.

Bednar, Sarah

[337] *The Baalche' Group: An Investigation of a Preclassic Maya Palace at Yaxnohcah, Campeche, Mexico*

As part of the ongoing research into the development of sociopolitical complexity at the Maya site of Yaxnohcah, the Proyecto Arqueológico Yaxnohcah has been conducting investigations in the Baalche' Group, a large courtyard group located at the center of the site. The group sits adjacent to many prominent architectural features, including a Preclassic period E-Group assemblage, a ball court, and a water reservoir. Radiocarbon dating and ceramic analysis has revealed that the Baalche' Group itself was founded during the Late Preclassic period and was continuously occupied until the Terminal Classic period. Furthermore, our research suggests that the group likely functioned as an early palace, a place where the emerging rulers of Yaxnohcah resided and governed. This paper will present the findings from the investigations in the Baalche' Group, with a particular focus on the factors that led to the early emergence of a palace complex at Yaxnohcah during the Preclassic period.

Beekman, Christopher (University of Colorado Denver) and Verenice Y. Heredia Espinoza (Colegio de Michoacán)

[179] *In the Land of the Blind, the One-Eyed Man Is King: Los Guachimontones, Jalisco*

The site of Los Guachimontones was occupied from the late Middle Formative to the end of the Postclassic period. It had a bimodal history of occupation, with the first peak corresponding to the Late Formative period (100 BC–AD 200) and the second to the Late Postclassic (AD 1400–1600). It had an estimated population of 4,000–6,000 people in the Late Formative, when most of the public architecture was constructed. This makes it a very modest settlement in comparison to other Mesoamerican capitals, but it was the primate center for the Tequila valleys, and likely all of far western Mexico at the time. Assessing its role has thus been complex. Here we consider the activities reconstructed for the site to date—a preference for community ritual over private ritual, cooperation over aggrandizement, and an orthodox interpretation of ideology—to characterize Los Guachimontones as an exemplary center that dominated the southern Tequila valleys. Beyond that zone however, lineage ritual increased in importance, highlighting the limits on the site's power.

Beggen, Ian (North Carolina State University) and Joseph A. M. Gingerich (Ohio University)**[262]** *Exploring Artifact Trampling at an Early Paleoindian Campsite*

Taphonomic processes such as trampling can have a major impact on the interpretation of site formation, artifact distribution, and use-wear analyses. This poster presents a preliminary spatial and lithic analysis of artifacts from the Shawnee-Minisink Paleoindian site in Pennsylvania, USA. Using a high resolution point-provenience database of Paleoindian artifacts, possible trampling damage is mapped and analyzed in order to distinguish if high foot traffic areas exist at Shawnee-Minisink, such as between hearths or zones of specialized activities. Trampling of lithic debris by human activity can be difficult to assess in the archaeological record. Evidence of trampling, however, is explored through multiple assessments: the vertical distributions of artifacts, the horizontal dispersion of different artifact types and sizes, and an analysis of artifact edge damage. Graphical displays of damaged artifacts and distinct spatial distributions allow for a better interpretation of activity areas and site occupation. In combining artifact metrics, artifact edge damage, and the spatial distributions artifacts we expect to identify incidents of cultural disturbance at Shawnee-Minisink. These data contribute to a larger body of spatial analysis research aimed at better understanding the occupation of mobile hunter-gatherer campsites.

Begossi, Alpina [45] see Colonese, Andre Carlo

Bélanger, Christian [178] see Loewen, Brad

Beldados, Alemseged (Addis Ababa University) and A. Catherine D'Andrea (Department of Archaeology, Simon Fraser University)**[171]** *Agricultural History of the Horn of Africa: New Archaeobotanical Evidence from Mezber*

Archaeobotanical analysis of samples from the site of Mezber are underway with the goal of investigating the early agricultural history of northern highland Ethiopia. Mezber is a Pre-Aksumite site excavated by the Eastern Tigray Archaeological Project (ETAP) with cultural deposits dating from 1600 BCE to CE 1, and occupied over four phases. In 2014–2016, a total of 59 soil samples ranging in size from 1.8 to 7.5 liters was processed by manual flotation. Macrobotanical remains from light fractions were identified with the help of comparative collections at the Archaeology Laboratory, Addis Ababa University. Identified crop species include barley (*Hordeum vulgare*), emmer (*Triticum dicoccum*), lentil (*Lens culinaris*), linseed (*Linum usitatissimum*) and the indigenous staple crop tef (*Eragrostis tef*). Direct AMS dates were obtained on charred lentil and barley recovered from the earliest occupational phase, with determinations of 2810±30 BP (1050–895 cal BCE) and 2780±30 BP (1004–844 cal BCE), respectively. These AMS determinations constitute the earliest directly dated evidence for crops in the Horn of Africa. In addition, the extended occupational sequence at Mezber provides a window on changing agricultural practice throughout the Pre-Aksumite period.

Belfer-Cohen, Anna [169] see Hovers, Erella

Beliaev, Dmitri (Knorozov Mesoamerican Center, Russian State University for the Humanities), Philipp Galeev (Knorozov Mesoamerican Center, Russian State University), Sergei Vepretskii (Lomonosov Moscow State University), Camilo Luin (Universidad de San Carlos de Guatemala) and Alejandro Garay (Universidad de San Carlos de Guatemala)**[298]** *Development of a Classic Maya Secondary Polity at Itzimte*

Itzimte (municipio La Libertad, Department of Petén, Guatemala) is a medium-sized Maya site in the savanna region in Central Petén. It was first described by Theobert Maler in 1908 and later visited by Sylvanus Morley in 1915 and 1921. In 2002 it was studied by Atlas Arqueológico de Guatemala team led by Hector Mejia. Itzimte consists of 6 principal plazas and 16 dispersed patio groups occupying about 50 ha. Monumental corpus of the site included 20 stelae (10 carved) and 12 altars (4 carved). During the fieldwork of the Atlas Epigráfico de Petén project from 2013 to 2016 we redocumented major part of Itzimte hieroglyphic inscriptions. Dynastic count recorded on Stela 7 implies that the ruling house of Itzimte was founded in Protoclassic (75–100 AD). Although Early Classic (250–600 AD) history is unknown, we identified names of Late Classic rulers. Late development of Itzimte comparing to other neighboring polities seems to be related to its alliance with Ik'a (Motul de San Jose) kingdom around 760–770 AD.

Belkin, Sara (Boston University) and Daniel Plekhov (Brown University)**[260]** *Potential for Spatial "Big Data" in Historical Archaeology: A Demonstration of Methods and Results*

Historical Archaeology has seen a steadily increasing embrace of Geographic Information Systems (GIS) for the purposes of site recording, preservation and management, but has seen little to no use of the plethora of spatial datasets already publicly available. Such datasets include census, tax, and immigration records, property and housing maps, and archived aerial and satellite imagery, which when properly integrated in a GIS, have great potential for further contextualizing historical archaeological data and analyzing them at geographically broader scales. In this poster we present some of these publicly available data sources with a case study examining the consumer practices of an Irish-American family in early twentieth-century Milton, Massachusetts. We draw on data from excavations at the M.B. Wakefield Estate, U.S. census records, and other sources to plot where they purchased their household goods and to determine if these places are best characterized as Irish neighborhoods. Through this we can explore questions related to transnationalism, alienation practices, and the importance of community. This case study will illustrate the potential of these sources for use in archaeological studies, the ease with which they can be accessed and utilized with conventional archaeological data, and their use in answering broad anthropological questions.

Belknap, Lori (Cahokia Mounds Museum Society)**[283]** *Chair***Bell, Ellen (California State University, Stanislaus), Marcello A. Canuto (M.A.R.I., Tulane University) and Cassandra Bill (Langara College)****[39]** *Pushing the Limits of Power: Copan Expansionist Strategies in the El Paraíso Valley, Western Honduras*

The reign of K'ahk' Uti' Witz' K'awiil, Copan Ruler 12, has been rightly hailed as a pivotal time in Copan's political history. Given that no monumental constructions on the Copan Acropolis have as yet been securely attributed to his patronage, this long-lived ruler appears to have turned his focus outward, expanding the Copan kingdom into a multiethnic polity with a long geographic reach. In this paper we explore Ruler 12's administrative strategy in one region of the Copan kingdom, the El Paraíso Valley. Stratigraphic evidence, radiocarbon dating, pottery and other portable material culture, and stylistic analysis of mosaic architectural sculpture suggest that the site of El Paraíso was established as a Copan-style administrative center in the mid-seventh century AD, nearly 20 years after Ruler 12's accession. In this paper we bring recent analyses to bear on questions about the timing, function, and affiliation of this center and its founding.

Bell, Ellen [71] see Johnson, Erlend

Bell, Lynne**[139]** *The Histotaphonomy of Human Skeletal Exposure within a Neolithic Long Cairn at Hazleton, UK*

The total excavation of the Cotswold-Severn Neolithic long cairn at Hazleton was unusually meticulous and represents an excellent example of long term skeletal exposure. Some discussion exists around the nature of bodies prior to deposition in these long cairn structures and histotaphonomy is here used to consider this question. The human remains at Hazleton were recovered from two spatially distinct stone-lined chambers in a highly disarticulated and commingled state. During excavation each element or fragment were individually numbered, totaling over 9,000. Later anthropological assessment managed to re-associate partial individuals, permitting a spatial understanding of scattering within each chamber. Two individuals from each chamber were assessed microscopically using confocal and backscattered electron imaging, to identify the histotaphonomic changes and their spatial relationships. The results indicate that different trajectories for disarticulation and body status at the point of interment may shed light on burial practices i.e., was the body intact at the point of interment or not? This group exhibited no cutmarks, and so the commingling, which contemporaneously extended over a 300-year period of use, needs some discussion. The histotaphonomy indicated, in this case, that bodies were likely intact at the point of interment.

Bell, Martin (University of Reading UK)**[287]** *Making One's Way in the World: Identifying and Dating Prehistoric Routeways*

Archaeologists focus on sites. This paper looks at ways of identifying patterns of habitual movement that made those sites part of a living landscape. It draws on paleoenvironmental evidence, ethnohistory from the American northwest coast and the microscale of human footprints. Patterns of movement by people and animals create structures within landscape, which influence the activities of subsequent generations and the perspectives from which they encounter and perceive landscape. Paths thus constitute a significant aspect of niche construction. Examples from British and European prehistory demonstrate that there are ways of identifying and dating prehistoric routes using the spatial relationship between monuments. Negative features, such as hollow ways, can be dated by their relationship to colluvial sediments from associated agricultural terraces using various scientific techniques (artifacts, mollusks, U-Series and OSL). The results challenge existing assumptions that the main prehistoric routes in Britain were ridgeways on hill crests. There is more evidence for the early origins of parallel systems of hollow ways crossing the grain of the landscape. It is proposed that these were associated with the activities of seasonal pastoralists. The paper outlines key themes from the writer's recently completed forthcoming book *Making One's Way in the World*.

Beller, Jeremy (Department of Anthropology, University of Victoria.)**[121]** *Raw Material Characterization and Lithic Procurement in the Azraq Basin, Jordan, During the Middle Pleistocene: Preliminary Results*

Recent excavations at Shishan Marsh 1 in the Azraq Basin, Jordan, have uncovered several artifact-bearing layers that date to the Middle Pleistocene. A paleoecological assessment of sediments from this period indicates predominantly warm and dry conditions in the region, similar to those of the present. Hominins living under these harsh conditions were forced to contract around a receding spring- and wadi-fed water source for subsistence. In this way, the distances they could venture to acquire resources were limited. Consequently, Shishan Marsh 1 presents the opportunity to investigate lithic procurement strategies practiced by Middle Pleistocene hominins in a water-stressed and arid environment. A macroscopic evaluation of the lithic assemblage revealed a nearly homogenous raw material composition with chert as the dominant stone type. A pilot provenance study of lithic sources in the region and a sample of artifacts are conducted using ICP-MS. The preliminary results indicate that local procurement of stone extracted material from predominantly one chert formation. The operation of the regional wadi-system as a potential secondary source are also considered, as it may have transported nodules toward the Azraq Basin.

Belli-Estrada, Francisco [218] see Robinson, Eugenia

Bello, Charles (Federal Emergency Management Agency [FEMA-DHS])**[394]** *Introduction to session and opening remarks***[394]** *Chair***Bellomia, Valeria (Sapienza, Università di Roma)****[347]** *The Materiality of Sound: Detecting Performing Patterns on Two Mesoamerican Bone Rasps*

This presentation focuses on some results of an interdisciplinary study carried out on two scraping idiophones made of human bones from ancient Mesoamerica (omichicahuaztli). Both the instruments are today on exhibit at the Museo Nazionale Preistorico Etnografico "Luigi Pigorini" in Rome. The detailed analysis of the bone surfaces allowed us to reconstruct the taphonomic processes that affected the bones and the steps employed to transform them into musical instruments. Our research team organized marks into an operational stratigraphy, reconstructing the sequence of stages in production and use: raw material procurement, cleaning, shaping, decoration and finally use-wear patterns. Marks related to this last stage were useful in detecting the performing pattern of the instruments. Once we obtained these material data, we could play both the instruments in a recording session, using their original scraping tools, which are an Oliva shell and a human fibula. This allowed us to analyze the acoustic characteristics of the instruments and to replicate their sound in the exhibiting space, giving museum visitors the possibility to "listen to," and not only "look at," both the omichicahuaztli, although behind a museum glass.

Bellorado, Benjamin Aaron (University of Arizona)**[373]** *Sandals from the Center Place, Footprints on the Pots: Continuity and Change in Twined Sandal Tread Designs from Chaco, Aztec, and Beyond*

Twined sandals were important components of Ancestral Pueblo ritual paraphernalia for a millennium. They were expensive and time consuming to make and many had patterns of raised knots woven into their treads that stamped footprints with complex geometric designs on the ground when worn. Scholars have postulated that twined sandals were likely used in communal rituals, dance performances, and even foot races. During the Pueblo II period, their use appears to have been connected with communal activities at Chacoan civic-ceremonial centers. After the collapse of Chaco, these sandal making and wearing traditions disseminated into disparate communities of the San Juan Basin, including the Middle San Juan. In this presentation, I discuss ongoing analyses of twined sandal collections, documenting continuity and variability of attributes of sandal shapes and tread design layouts from Chaco Canyon, Aztec Ruins, and other post-Chaco communities in the region. While few sandals have been dated absolutely, I compare sandal designs with well-dated Pueblo II-era decorative styles from painted pottery and other media to date them relatively. With this research, I hope to shed important light on how twined sandals functioned similarly or differently at these two centers of Ancestral Pueblo society (and beyond), over time.

Bellorado, Benjamin Aaron [60] see Gearty, Erin

Belmaker, Miriam (University of Tulsa) and Ekaterina Sevastakis (University of Virginia)

[244] *Taphonomic Analysis of the Small Mammal Assemblage of Hayonim E: Implications for Paleoeecology of the Southern Levant During MIS 6*
This study presents the taphonomic history of the small mammal assemblage of Hayonim E, Israel, and compares it to those of other Middle Paleolithic (MP) sites. Levantine paleoecological changes during the MP have implications for hominin dispersal into the region. It has been suggested that a comparison of faunal assemblages from Hayonim (160–130 Kya), Qafzeh (120–90 kya) and Amud (75–45 kya) indicate a shift between glacial and interglacial fauna which mirror dispersals by Neanderthals and modern humans. However, these analyses do not account for possible differences in the predator accumulating the fauna among the sites studied. Analyses of the taphonomic history is critical before inferring the paleoecology of the site and only sites that were accumulated by the same predator may be compared with rigor. Results suggest that the assemblage from Hayonim E and Qafzeh were accumulated by barn owls while the assemblage from Amud cave was accumulated by Eagle owls. Barn Owls (*Tyto alba*) take prey in proportion to its abundance in the environment and thus, fossil assemblages derived from this taxon are excellent indicators of the environment; although comparison among sites should only be done with caution, given their different taphonomic histories.

Belmar, Carolina (Dpt. Antropologia, Universidad de Chile) and Andrea Troncoso (Dpt. Antropologia, Universidad de Chile)

[232] *Residues Analysis of Bedrock Mortars of the Limarí River Valley (Ivth Region, Chile): Evaluating Plant Exploitation among Late Holocene Hunter-Gatherers*

For an integral understanding of bedrock mortars, as a product and producer of social practices, we have carried out research in the Limarí River valley (Chile) (Fondecyt Grant N°1150776). One dimension of this research was directed to answer the following questions: were these cupules used to grind plants? And if so, what plant resources were used by these hunter-gatherer groups? Do these include cultivate domesticated plants? And how does it relate to the association “initial pottery/horticultural practices” in the area. In an initial analysis we confirmed the grinding of local wild plants in five sites in the area and the presence of starch grain of *Zea mays* in one site. Now we shall extend the morphological and residue analysis of the cupules of a total of 10 bedmortar sites. This consists in the recovery and identification of microfossil evidence in use residues of the cupules, plus the registration of the morphological attributes of the cupules. The objective is to reach a better comprehension of late Holocene hunter-gatherer groups of this area, and have an insight of their plant exploitation strategies, referred to the use of wild plants and the possibility evaluating the use of domesticated plants.

Beltran, Boris [131] see Saturno, William

Bement, Leland (Oklahoma Archeological Survey, OU)

[332] *Open-Air Camps of the Terminal Pleistocene and Early Holocene: An Introduction*

Open-air camps from the terminal Pleistocene and early Holocene pose significant challenges in excavation, analyses, and interpretation. This international symposium provides a formal setting to continue a series of discussions on site formation, analytical trends, and interpretations. Key topics include defining site boundaries, contemporaneity of activity areas, population estimates, and the possible effect of thresholds in the arrangement and longevity of site use. Of particular interest is the question of what is the diversity represented in site layout and function during this time period.

[332] *Chair*

Bement, Leland [332] see Carlson, Kristen

Bemmann, Jan (University of Bonn) and Susanne Reichert (University of Bonn)

[25] *Karakorum, Mongolia, a Complex Urban Site in a Nonurban Society*

It is undisputed that Karakorum was founded by the Mongol Emperor/Khan, saying this means we analyze a top-down planned large city in a non-sedentary, nonurban society. Therefore we will address the question of the layout of the city and the spatial organization. How are activities and people ordered, is there common space, what kind of infrastructure is provided by the city founders and how is it maintained during the nearly 200 years of the existence of the city. At which areas were landmark buildings erected, where did the emperors place public monuments like propaganda stelae, how did they use architecture as a symbol of power? Are there any changes in the layout of the city, traces of decay? Was the master-plan of the city planners ever finished or do we see a rapid decline after the city lost its status as a capital? What criteria do we have to differentiate town quarters? Where are the cemeteries and are there any indicators for elite burials? Share locals and foreigners the same cemetery or has each ethnic or religious group its own cemetery? What social status did the inhabitants have and where did they come from?

Benden, Danielle (University of Wisconsin-Madison)

[2] *Discussant*

Bender, Morgan (California State University, Los Angeles), Amira F. Ainis (Department of Anthropology, University of Oregon), Victoria Scotti (Department of Anthropology, California State University) and René L. Vellanoweth (Department of Anthropology, California State University)

[300] *Collection of Crustaceans and Echinoderms during the Middle Holocene on the West End of San Nicolas Island, California*

We present the preliminary results of crustacean (crab) and echinoderm (sea urchin) remains from CA-SNI-40, a large Middle Holocene (~4440–3650 cal BP) dune site located on the West End of San Nicolas Island, California. Our study provides detailed identifications and quantitative analysis of crab and sea urchin remains that will contribute to previous faunal studies at this site, which identified over 88 shellfish taxa including dietary and non-dietary species. Preliminary results indicate that seven taxa of crab (*Brachyura*) and two indistinguishable species of sea urchin (*Strongylocentrotus* spp.) are present in fairly high densities. A dense urchin lens is present throughout much of the site, indicating that people harvested this resource in extremely high numbers during the time of occupation. We compare density values based on weight and minimum number of individuals (MNI) between two excavated loci to examine differences in harvesting patterns at this site. Morphometric measurements of crab dactyls indicate that people were collecting specimens of all age classes from littoral and kelp forest habitats. Our results suggest that the marine ecosystems on the West End of San Nicolas Island served as a productive and diverse site for human harvesting during the Middle Holocene.

Benedetti, Michael [165] see Haws, Jonathan

Benfer, Adam (University of Calgary)**[296]** *Faring the Sweet Sea: Simulating Prehispanic Raft and Canoe Navigation in Lake Cocibolca, Nicaragua*

Before 1492, the human communities that inhabited the shores of Lake Cocibolca in Central America engaged in dynamic interactions and exchange networks, traveling across the land and canoeing or rafting on the lake and rivers to trade goods and communicate with their neighbors. Evidencing this travel network, archaeological studies have documented an abundance of ceramics and carved stone that the past inhabitants of the Lake Cocibolca region produced and traded widely during the later prehispanic periods (AD 300–1550). To shed light on this interaction and exchange network, I use a geographic information system to predictively model the optimal aquatic communication routes among the nearshore and island-based settlements of this lake. This model utilizes seasonally averaged environmental variables of surface current and wind patterns and cultural variables of navigator skill, vessel shape, and propulsion method to simulate a series of lacustrine voyages. Through this model, travel times and probable routes are estimated. These simulations indicate that Lake Cocibolca is navigable by dugout canoe and raft under average conditions and it is likely that canoe travelers would have taken advantage of the prevalent current and wind patterns to contact their neighbors via this large freshwater lake.

[296] *Chair*

Bengtson, Jennifer (Southeast Missouri State University), Jodie O’Gorman (Michigan State University) and Amy Michael (Michigan State University)**[185]** *Life during Wartime: Children, Violence, and Security at Morton Village*

Children are not immune to the violence of war. They can be incidental victims, prime targets, active participants, beneficiaries of fierce protection, or the recipients of warfare-related symbolic action. Though not subject to the same high rates of violent trauma as their adult counterparts, the available osteological data show that a small number of children interred in the late prehistoric Norris Farms #36 cemetery in Fulton County, Illinois did suffer traumatic injuries, both fatal and nonfatal. Some children were victims of scalping, while at least one was potentially the recipient of a human trophy as part of associated mortuary ritual. We revisit the osteological and mortuary evidence for children’s involvement in warfare at Norris Farms #36 and seek to contextualize it within the ethnographic literature on childhood in times of war. We also consider the somewhat obvious observation that some individuals in this skeletal series—including most children—bear no osteological evidence of physical violence. Consequently, we broach the concept of security as we consider children’s day-to-day lives at the associated Morton Village site and the broader landscape; How might this community have created secure spaces for the physical protection of children and other vulnerable people in the face of danger?

Benjamin, Derek [394] see Ngirmang, Sunny

Bennett, Gwen (McGill University, Depts. of Anthropology and EAS)**[25]** *The Archaeological Study of Cities in East Asia*

This paper explores the study of cities in China and the implications for their archaeological investigation. Walled settlements developed in China during the Neolithic and by the Bronze Age many had already grown to considerable size and complexity. While scholars in China and East Asia often consider cities to be a form of settlement organization starting at this early date, the concept of city used in their study is frequently unexamined, and historical examples of cities in the Chinese heartland are used as models to understand earlier sites, or sites outside of this region that may have developed differently or had different uses. These long-held concepts of what premodern cities were and who lived in them developed from the study of rich historical documentation but have now come to limit understandings of cities by constricting the available range of interpretation.

Benson, Erin [228] see Campbell, Sarah K.

Bentley, Heath (Texas State University), Lauren Sullivan (University of Massachusetts/Boston) and James Garber (Texas State University)**[370]** *An Analysis of Historic Glass Containers from St. George’s Caye, Belize*

From 2009 to the present, an abundance of whole and partial glass bottle remains of various types have been recovered throughout excavations on St. George’s Caye, Belize. Much of the glass collection has been found within the island’s cemetery among an assemblage of various other historic artifacts. The majority of the bottles and bottle fragments have been identified as eighteenth- and nineteenth-century English cylindrical bottles. In 2016, analysis of this assemblage commenced in order to determine a date range for manufacture of the bottle sample using analysis methods designed by Jones (1986) and Carillo (1973) to estimate manufacture date through measurement. Jones and Carillo’s methods were used to date six whole dark green glass cylindrical bottles that have been recovered from the island. Bottle base and finish fragments have been dated based on physical indicators of style and method of manufacture present on the bottle fragments as described by Jones (1986). This evaluation includes lip to string lip ratio, lip and string rim style and style of base and pushup among other features. The results of this analysis will help to provide a relative date range for the deposit of the assemblage from the cemetery at St. George’s Caye.

Benyshek, Tasha and Paul Webb (TRC Environmental Corporation)**[160]** *Mississippian Occupations at the Ravensford and Iotla Sites*

Recent large-scale excavations at the Ravensford and Iotla sites, and elsewhere in western North Carolina’s Cherokee “heartland,” have documented Mississippian components that include architectural remains as well as artifact assemblages. But while Late Mississippian occupations have been found on many sites, Early and Middle Mississippian households and settlements have been difficult to isolate. Increased numbers of systematic surveys and excavations in recent years have uncovered evidence of these less visible occupations. Early and Middle Mississippian phases in western North Carolina have not been formally defined, but include both Early Pisgah and Etowah related phases. Mississippian influence appears to have been present during Early Pisgah in the form of flexed pole architecture, use of shell tempered ceramics, and maize agriculture. No evidence has yet been recovered that mounds were built during the Early Pisgah phases. By the Early Qualla phase, which includes later Pisgah ceramics, all of the hallmarks of Mississippian culture appear to be present. It is unclear if a chiefdom level of sociopolitical organization was present, however, and individual Mississippian towns and associated dispersed communities in the mountains may always have been relatively independent, as was true of the later Cherokee towns.

Berdan, Frances (California State University San Bernardino)**[225]** *Discussant*

Berenguer, José [134] see Nielsen, Axel

Berger, Elizabeth (UNC-Chapel Hill)**[279]** *Oral Health in the Middle Yangshao Guanzhong Basin*

The Middle Yangshao cemetery at Yangguanzhai is the first cemetery of this period ever found in the Loess Plateau of China. This paper presents the results of an analysis of the oral health of this population, which found lower rates alveolar abscesses, occlusal wear, antemortem tooth loss, caries, calculus, and linear enamel hypoplasias than would be expected in a typical Neolithic agricultural population. This sheds light on the diet of the Yangguanzhai population. The paper also places the results in comparative perspective with other populations of Central and Northwest China.

[279] *Chair*

Berger, Elizabeth [115] see Chen, Liang

Berger, Martin (National Museum of World Cultures, The Netherlands)**[267]** *Turquoise Mosaic Skulls: Understanding the Creation of an Object Type*

In 1932, Alfonso Caso and his team found a human skull decorated with turquoise mosaic tesserae during their well-known excavation of Monte Albán's Tumba 7. To this day, this is the only artifact of this type to have been found in a documented excavation. Nevertheless, at least twenty turquoise mosaic-decorated human skulls are currently held in museums and private collections. Many of these have been considered forgeries, others are considered authentic. Within this group, there are clear iconographic and stylistic differences, an indication that these 'mosaic skulls' were not all made by the same original culture, or forger. In this presentation, I will present an overview of the corpus of mosaic skulls known to date and trace their object biographies. Through this study of provenance and iconography, I will try to answer the question "Are mosaic skulls a twentieth century invention, or are they a genuine Mesoamerican artifact?"

Bergersen, Ove [224] see Martens, Vibeke Vandrup

Bergin, Sean (School of Human Evolution and Social Change, ASU), Salvador Pardo Gordó (Department of Prehistoria i Arqueologia, Universitat), Michael Barton (School of Human Evolution & Social Change, Arizona), Joan Bernabeu Aubán (Department of Prehistoria i Arqueologia, Universitat) and Nicolas Gauthier (School of Human Evolution & Social Change, Arizona)**[38]** *Testing Social and Ecological Drivers for the Initial Spread of Agriculture on the Iberian Peninsula*

Much initial research into the arrival and dissemination of agriculture in Europe has focused on identifying the speed and direction of the arrival of Neolithic subsistence. More recent work has begun to examine the chronological and spatial patterning of the spread of agriculture with the goal of identifying important sociological or environmental factors that affected the timing and location of agricultural settlement. In this context, agent-based computational modeling is emerging as a sophisticated platform from which to test social and ecological drivers for the neolithization of Europe. In this case study, we use the Iberian peninsula as the setting for a computational model of Neolithic spread in order to test multiple processes that have been proposed as mechanisms for the spread of agriculture in Europe. The inclusion of state-of-the-art crop models, based on downscaled paleoclimate models allow us to more accurately simulate ecological conditions that individuals or groups may have favored when establishing a settlement in a new location. The results from these computational hypotheses are evaluated against a high resolution chronological dataset for the arrival of agriculture to the Iberian peninsula. The integration of paleoenvironmental and conceptual models provides a unique perspective for the evaluation of Neolithic spread mechanisms.

[268] *Discussant***Bergsvik, Knut Andreas (University of Bergen, Norway)****[68]** *The Ambivalence of Caves and Rockshelters in Medieval Norway*

Caves and rockshelters occur frequently in Norway and they were extensively used as dwelling-sites for humans in most periods of the prehistory. During the transition to the medieval period (AD 550–1500), however, archaeological excavations show that their use changed significantly. From then on, they mainly served as offering sites, burial sites and as workshops for metal smiths and stone masons. This change may have been related to a change in the perceptions of caves and rockshelters. One gets a glimpse into these later perceptions when studying the medieval saga texts and eddic poetry from Iceland. In these texts, there is a marked ambivalence concerning these places. Caves are, on the one hand, portrayed as scenes for negative actions and incidents, and are associated with dangerous and threatening beings and powers in the Norse mythology. On the other—when people communicate with these beings—caves and rockshelters are places where wisdom, wealth, and status can be achieved. It is argued that the ambivalence led to a general avoidance of the shelters for dwelling purposes, and to a favoring of them as arenas for worship and ritual.

Berman, Mary Jane [395] see Gnivecki, Perry

Berna, Francesco (Department Archaeology, Simon Fraser University)**[338]** *Site Formation Processes at Manot Cave, Israel*

Manot Cave, represents today one of the richest Upper Paleolithic assemblages in the Levant. The site has produced a 55,000 year old anatomically modern human skull, as well as Middle Paleolithic to Post-Aurignacian lithic and bone artifacts. The rich assemblage is found in an "unusual" situation, with an in situ occupation area at the top of a talus and close to a currently blocked entrance. The occupation area defined by in situ combustion features is replete with artifacts, and so is the talus slope. Understanding this site requires a basic untangling the processes responsible for the formation of the talus slope, in addition to the occupation area. Here we present the results from an extensive microarchaeological investigation and high resolution 14C dates conducted in several excavation areas.

[338] *Chair*

Berna, Francesco [354] see Wiebe, Matthea

Bernabeu Aubán, Joan [38] see Bergin, Sean

Bernal-Casasola, Darío**[378]** *Rome and Cetaceans: Archaeological Evidence from the Strait of Gibraltar*

Over the past 10 years, bones from whales and other marine mammals have been uncovered from archaeological excavations of Roman cities around the Straits of Gibraltar (Baetica and Mauritania Tingitana coasts). The high frequency of archaeozoological remains and their location within fish-preserving contexts (cetariae) has suggested the active exploitation of cetaceans throughout the Roman Imperial period (II BC–V AD). This paper reviews the evidence from Baelo Claudia, Iulia Traducta, Septem Fratres and Tamuda, the sites from which the majority of the finds are located, and where the use of salted whale meat and other products has been proposed within fish-salting factories, as noted by some classical authors (Galen, among others). This is the area of the Atlantic-Mediterranean region in which the most archaeological, zooarchaeological and iconographic evidence has been documented, and which is currently being investigated to demonstrate that whaling, traditionally attributed to Basque in the Cantabrian in the Middle Ages, began in classical antiquity.

Bernard, Henri (Université Paris 1 Panthéon Sorbonne) and Sara Ladrón de Guevara (Universidad Veracruzana)

[3] *Olmecs Masks in the Region of Arroyo Pesquero*

In a detailed analysis of some figurines of the offering 4 of La Venta, we observed that some of them were carved wearing a mask. This is hardly visible because the representation of the mask is a realistic human face. It seems to have a close relationship with the stone masks found a few kilometers from La Venta, in the site of Arroyo Pesquero, Veracruz, a site of Olmec offering reported in 1969 by the archaeologist Manuel Torres where a lot of lithic material was discovered. Among these there are axes, figurines and masks of stone, which reproduce realistic human faces with particular characteristics, as if they were trying to represent a particular individual. In other collections we have found identical trait in some figurines in Olmec style, which have the same representation as if they were wearing a mask. This evidence reveals the use of masks in rituals by living people and not just as part of funerary paraphernalia. What was the meaning of these masks? Are they related to a particular period and region? These are some of the subjects addressed in this presentation.

Bernard, Michael [394] see Guilfoyle, David

Bernstein, Bruce (Tribal Historic Preservation Officer, Pueblo of Pojoaque)

[34] *Moving Ideas, Staying at Home: Change and Continuity in Eighteenth-Century Pueblo Pottery*

Sometimes staying in place requires movement. To stay in their precontact villages required that Pueblo people shift loci of cultural practice as well as reorder intellectual and material culture. New styles of pottery, including the adaptation of blackwares, quickly moved from one Rio Grande pueblo to the next. By the close of the eighteenth century, pottery changed and is adapted in its use for storing, preparing, and serving wheat-based foods such as oven-baked bread. The movement of new pottery styles might be understood as an adaptive strategy to keep villages intact. Although a precept of Tewa culture is movement, evidence suggests that seventeenth- and eighteenth-century Pueblo leadership believed that moving from established villages might permanently and irrevocably disrupt cultural continuity because Tewa culture is based on movement creating continuum rather than change. These are primarily sentient and stable cultural adaptation strategies rather than episodic or forced change as the older anthropological literature and researchers continue to suggest. The research utilizes historic and ethnographic data and museum collections along with archaeological collections from Tewa villages, a materiality record that documents Tewa worldview, adaptation, and survival—Tewa people's reaction and adaptation to Spanish introduced ideas.

Berón, Mónica [174] see Archila Montanez, Sonia

Berquist, Stephen (University of Toronto), Erick Casanova Vasquez (Universidad de San Marcos), Abigail Gamble, Samantha Seyler (University of Pennsylvania) and Steven A. Wernke (Vanderbilt University)

[75] *Elite Domestic Spaces and Daily Life in a Reducción*

The archaeology of Spanish colonialism in the Andean region is coming into increasing focus with the documentation of Spanish colonial doctrinas and reducciones, along with the excavation of religious structures, public spaces, and elite and common indigenous households. However, we still lack a clear comparative diachronic perspective of how Spanish colonialism affected the daily lives and values of indigenous Andean peoples. This paper presents the results of the 2016 excavations of three large stone structures and two smaller associated structures in the Spanish colonial reducción of Santa Cruz de Tutí, in the Caylloma Province of Arequipa, Peru, occupied from the precolonial era until its abandonment in 1843. We argue that these compounds comprise the domestic spaces of kurakas, local chiefly authorities in both precolonial and Spanish colonial contexts. We present evidence that various of these spaces were in use from near the founding of the reducción in the late sixteenth century to its abandonment in the mid-nineteenth century. As such, our excavations yield valuable comparative data on the domestic lives of the elite indigenous classes of Spanish Colonial Peru and their changing values, lifeways, and bodily habitus over the course of Spanish Colonialism and into the early Republican period.

Berres, Thomas

[385] *Bear Imagery and Ritual in Midwest North America*

The American black bear figured prominently in the visual arts, rituals, ceremonies, and cosmological beliefs of Native peoples inhabiting Midwest North America through antiquity. Bears are almost universally perceived as great Lower World spiritual beings possessing the power to cause or cure illness, maintain life, and change its form where bears become people and vice versa. Their remains and images are often found in mortuary ritual contexts—a powerful means of communicating emotions and central themes of the culture. Drilled bear canines (metonymies of power) and effigy pipes occur in such traditional religious contexts. The importance of the black bear's head in ceremonies and rituals is documented in the historic and archaeological record, which involved the consumption of brains at feasts, public display of skulls on poles, and use of skull masks at ceremonies. Late Woodland Period (1400–750 BP) bear effigy mounds also provide visual aesthetic evidence of group identity and cosmological beliefs, indicating that monumental architecture (like all Native art) cannot be separated from religious practices. This study provides archaeological evidence of religious traditions shared cross-culturally in antiquity regarding the bear, which elicited power over the human imagination and spirit.

Berry, Alexander

[46] *Sea Level Fluctuations of the Southern Salish Sea: An Assessment of the Archaeological Potential for Sites Dating from the Last Glacial Maximum to the Holocene*

Following the last glacial maximum, coastlines around the world drastically changed. This occurred through a complex combination of geomorphological processes, which were compounded by global sea level rise. While these fluctuations took place, humans adapted to an aquatic subsistent lifestyle along coastal regions. This study focuses on the southern Salish Sea (located in North America's Pacific Northwest) and human-environmental interactions during the terminal Pleistocene. Through the use of a predictive model (reevaluated for international application), a holistic methodological framework developed in the Baltic Sea was utilized to address questions regarding archaeological potential in the southern Salish Sea. A dataset was compiled incorporating environmental, ethnological, and archaeological information—for an analysis of the region and its inhabitants. This data enables

the production of paleo-landscape reconstructions at 14,000 BP, 11,000 BP, and 6000 BP, which illustrate the prehistoric coastal configurations influx caused by sea-level fluctuation. Concluding from this research, the sea-level history of the southern Salish Sea is defined in accordance to the amount of dynamic change that has occurred over the past 14,000 years. With precontact sites ranging from inland to completely inundated, the data provided in this study yields information regarding the varying degrees of Paleoindian and Archaic archaeological visibility.

Berry, Meg (Centre for Rock Art Research and Management—University of Western Australia)

[175] *It's All a Bit Retro: Investigating Early Phase Rock Art on the Dampier Archipelago, Northwest Australia*

Murujuga, located off the northwest coast of Australia, possesses one of the largest and most vibrant open-air rock art galleries on the planet. On Murujuga, low erosion rates, durable geology, and growing evidence from the wider region has allowed for archaeological contextualization of rock art into deep time; giving researchers the opportunity to investigate both the changing social dynamics of groups and the stimuli for this change over thousands of years. The main objective of this paper is to report on the findings from research undertaken over the past three years within the ARC funded Dynamics of the Dreaming Project investigating how early cultural lifeways on Murujuga are evident in the associated rock art phases; and to examine shifting social geographies during periods of extreme social and environmental pressure. Through the tethering of a stylistic analysis focused on rock art motifs associated with early phase rock marking on Murujuga, with archaeological, social, and chronological indices this paper aims to illustrate and discuss how rock art evolved and was mobilized within the natural and social landscape throughout time.

Bérubé, Éloi (McMaster University), Shanti Morell-Hart (McMaster University) and Sophie Reilly (McMaster University)

[22] *Arts and Sciences of Ancient Plants at McMaster University*

Since 2013, the McMaster Paleoethnobotanical Research Facility (MPERF) has explored questions surrounding the relationship between humans and plants, including plant cultivation and collection, consumption and social uses of flora, and interactions between people and landscape. Active projects address human-plant dynamics throughout different regions of Mesoamerica, South America, and Ontario, at time periods ranging from the Late Pleistocene through historic periods. With recent support from the Canada Foundation for Innovation, laboratory work has turned toward refining techniques for microbotanical analysis and applying Raman spectroscopy to botanical residues. This presentation centers on the study of macrobotanical and microbotanical remains to address three foci: meal production and everyday practices in the Late Formative Lake Titicaca basin of Bolivia; foodways and ethnoecology at Southeastern Mesoamerican sites; and changes and continuities in Mixtec lifeways during the Early Spanish Colonial period at the site of Achiutla in the Mixteca Alta region of Mexico. We highlight collaborations with broader networks and institutions, as well as the ongoing training in paleoethnobotanical techniques and interpretative strategies currently taking place at the MPERF. These efforts fit into a long tradition at McMaster of the application of novel methodologies in archaeological sciences to answer social questions.

Bestel, Sheahan and Tianlong Jiao (Denver Art Museum, USA)

[229] *Plant Residues from the Pre-Austronesian Tanshishan site (c. 4300 BP) and Their Interpretation*

A mid-Neolithic expansion of farming cultures into the coastal areas of Fujian province, located opposite Taiwan on the other side of the Taiwan Strait, occurred around c. 4300 cal BP. Crops including foxtail millet and rice formed part of these farmers' diet, and plant remains such as bamboo, possibly used for wooden cooking implements, were also common in sediments and residues at these Longshan-period sites. Plant residues from pottery fragments excavated from the Tanshishan site, located in Fujian Province, eastern China, have the potential to shed light on the subsistence and diet of the proto-Austronesian seafaring people who occupied Taiwan and subsequently spread across parts of the Pacific and into Australia. Despite the suggested ancestry of the Tanshishan culture to proto-Austronesian sites such as Damaoshan and Huangguashan, plant remains recovered from the proto-Austronesian sites were poor and crops were difficult to identify. The implications of the results from the research on residues and plant remains on the public understanding of Austronesian origins will be discussed.

Bethke, Brandi (Oklahoma Archeological Survey)

[127] *Domesticated Animals as a Source of Cultural Change during the Contact Period on the Northwestern Plains*

Despite functioning as pack animals, guards, religious figures, and even companions, dogs were never as integral to Blackfoot culture as the horse became. To date, researchers have most often characterized the relationship of Blackfoot people and their horses by framing the horse as an "upgraded model"—a "new and improved" dog. While prior experience with domesticated dogs did facilitate the incorporation of horses into the daily lives of Blackfoot people, this paper argues that the fundamental differences between dogs and horses prove to be one of the greatest sources of cultural change between the pre- and postcontact periods. Through a framework that integrates archaeology, history, and contemporary ethnography this paper will identify these key differences in order better understand how the horse fostered new and dramatically different conceptions of domesticated animals that in turn had significant effects on the value of dogs within equestrian Blackfoot culture.

[127] *Chair*

Bettencourt, Luis

[277] *The Intellectual History of Settlement Scaling Theory*

There is a long history of comparative empirical studies of settlement sizes in relation to evidence relating to nature and scope of built environments and human socioeconomic activities. However, only recently have consistent theories of settlements been developed that yield specific predictions that can be tested against archaeological evidence. In this paper, I present a brief intellectual history of these ideas to show how they incorporate concepts from various disciplines with an emphasis on archaeology and sociology, as well as urban economics and geography. Specifically, I will show how ideas of socioeconomic "agglomeration," developed originally to explain modern cities and interpreted in light of social activity over built spaces, have a much larger scope and provide a general logic that can be tested in any settlement system throughout history. Archaeological evidence in favor of such theoretical predictions allows important inferences about the structure of social networks of communication and exchange between people and their intensity and efficiency in specific places and times. These ideas also provide connections to mechanisms of cultural evolution and "economic growth" in ancient societies, such as the division of labor and knowledge in settlement systems, and lead to new uses and interpretations of archaeological evidence.

Bettinger, Robert (University of California-Davis)

[286] *Discussant*

Bettinger, Robert [99] see Morgan, Christopher

Bettis, E. Arthur [342] see Doershuk, John

Betz, Barbara (Ohio State University) and Jessica Pearson (University of Liverpool)**[73]** *Recontextualizing the Dead: A Geospatial Approach to Synthesizing Bioarchaeological Data at Çatalhöyük*

Two decades of excavation at Çatalhöyük have produced a skeletal assemblage of approximately 555 individuals from primary, secondary, and primary-disturbed Neolithic (7100–6000 cal. BCE) deposition contexts. As personnel and digital technology have changed, integration of the large body of legacy bioarchaeological data with current research has posed many challenges. Often, analyses of osteological data patterns have relied on broad comparisons of temporal and spatial categories drawn from nominal data in the site database, such as comparisons between individuals buried within different types of houses, or groupings of earlier and later stratigraphic layers. However, as Geographic Information Systems (GIS) software has been incorporated into site-wide research methodologies, new opportunities have arisen to explore more fine-grained geospatial patterns in the skeletal record at Çatalhöyük and provide new insights into diet, nutrition, disease, growth, development, and other aspects of life and death at this complex Neolithic settlement. This study explores the benefits and challenges of using GIS to integrate legacy data from the site database, (i.e., age, sex, and long bone measurements), with recently collected data, such as dietary isotope results and dental stress indicators, to develop new understandings of demographic and osteological patterns based on spatial visualization and tools of geospatial analysis.

Bevan, Andrew [58] see Li, Xiuzhen

Bewley, Robert (University of Oxford, School of Archaeology)**[70]** *Basket Case? Finding Funding for Archaeological Projects: A European Perspective*

The competition for funding is increasing, as demand increases but the sources of funds diminish, especially if there is a research element in any proposed project. This paper will explore the possible routes for funding and the potential and pitfalls of using a “basket” approach to raising funds for archaeological projects in the public sector (i.e., charities and noncommercial), including universities. It will also look at different approaches for funding significant heritage-based projects (including national lotteries). I will also briefly use the Endangered Archaeology in the Middle East and North Africa Project as an example of what can (and what can’t) be achieved.

Bey, George J. (Millsaps College), Stephanie Simms (California Digital Library, University of California) and Betsy Kohut (Millsaps College)**[5]** *2000 Years of Eating: Continuity and Change in Food Practices Among the Puuc Maya*

This paper examines the evidence for what and how the Maya of the Puuc region ate during the long history of occupation of this region. Data collected from almost two decades of research by the Bolonchen Regional Archaeological Project and covering close to two millennium of occupation are used in this exploration of eating. Household archaeology primarily from the site of Kiuc and the suburban site of Stairway to Heaven, and ceramic data from throughout the BRAP study area provide insights into continuities and change during the Maya occupation of the Puuc region. Among the most important findings is the evidence for dramatic changes in daily practices of eating that took place from the Preclassic to Classic periods at the household level. These changes are argued to reflect significant differences in how Preclassic and Classic Maya saw their social relations between themselves, other family members and the larger social world. Ethnographic data and comparative archaeological data are used to further examine what these patterns in Maya ceramics may mean.

[67] *Discussant*

Bey, George J. [101] see Seligson, Ken

Beyer, Autumn (Michigan State University), Terrance Martin (Curator Emeritus of Anthropology, Illinois State M) and Jodie O’Gorman (Michigan State University)**[299]** *Power and Purpose: The Role of Animals in Ritual Context at a Mid-Continental Site in the Fourteenth Century*

A variety of ritual contexts are documented at the Oneota and Mississippian Morton Village site and the associated Norris Farms Cemetery in Fulton County, Illinois. These include multi-scalar mortuary contexts, communal ritual structures, and smaller domestic-related facilities. Animal remains from both food and faunal tools, along with artifacts that are imbued with animal symbolism, were found in each context. This paper explores the variability and looks for patterning of animal use within these ritual contexts to better understand the linkages between animals and religion within a social context of ethnic interaction and cultural negotiation.

Beyin, Amanuel (University of Louisville), Hong Wang (Illinois State Geological Survey, Prairie Research), Mary Prendergast (St. Louis University, Madrid) and Katherine Grillo (University of Wisconsin–La Crosse)**[146]** *Terminal Pleistocene and Early Holocene Settlements in West Turkana (Northern Kenya): New Radiocarbon Dates*

Lake Turkana in northern Kenya has played a central role in generating archaeological and paleoclimatic datasets relevant to studying key transitions in human prehistory. Generally, despite its rich Plio-Pleistocene hominin fossil record, the later prehistory of the basin, particularly the period between 50 and 10 ka, remains comparatively underexplored. In this paper, we discuss new radiocarbon dates from two recently excavated sites in West Turkana, namely Kokito 01 (GcJh11) and Kokito 02 (GcJh12). The sites span the terminal Pleistocene and early Holocene (14–10 ka), a time of substantial ecological and cultural changes globally. Site chronologies are interpreted with reference to fluctuating lake levels during the African Humid Period. Well-dated sites from this timespan are scarce in the Turkana Basin, and the new radiocarbon dates are important for establishing human settlement history and associated cultural developments in the region during shifting climatic conditions at the Pleistocene-Holocene transition.

Bezy, Philippe**[347]** *Maya Shell Trumpets: An Interpretative Pivot*

For the ancient Maya, the use of music was often depicted as central to ritual activity. One of the longest lasting instruments, the shell trumpet, provides ample material for analysis. My three-pronged interpretive approach is made possible by the shell’s use in ancient ritual contexts, its appearance in Classic era iconography, and its organic origins. Archaeologically provenanced trumpets, for example, yield deposition data, while art historical methods address both unprovenanced trumpets and their depictions in Maya art. Malacological information about marine mollusks and their ecological niche offer a supplementary layer to interpretative efforts that impacts our understanding of ancient Maya shell selection. The conjunction of the three approaches emphasizes the ritual function shell trumpets fulfilled and further indicates an association between specific species and specific ritual practices. What is more, some examples suggest a concerted effort to coordinate the species chosen with other ritually important components like directionality and color.

Biagetti, Stefano (CaSEs—Univ. Pompeu Fabra [Barcelona, Spain])**[57]** *Remote Sensing for Late Holocene Archaeology in Central Sahara: A Multi-Scalar Approach*

At the end of the African Humid Period (c. 5,000 years ago), the Sahara became dry. Yet, in spite of the onset of current arid conditions, human societies found successful strategies to cope with reduced rainfall and patchy natural resources. Archaeological evidence from the arid Sahara, dated from the last five millennia, can be studied by means of Earth Observation techniques. In this paper, we will present the results of our research from central Sahara, aimed at the remote reconstruction of the geomorphology, environment and archaeology of selected areas. We will focus on multiple-resolution remote sensing based upon multispectral and panchromatic imagery (e.g., Corona, Landsat, ASTER, Worldview) to understand the development of cultural trajectories in arid lands, complementing data collected from previous fieldwork and implementing the knowledge of currently inaccessible areas.

[314] *Discussant*

[57] *Chair*

Biagetti, Stefano [57] see Conesa, Francesc C.

Bianchini, Paola Cortez [384] see Miller, Paul R. M.

Bicho, Nuno (Universidade do Algarve) and João Cascalheira (ICArEHB—Universidade do Algarve)

[389] *A Critical Review of the Meaning of Short-Term Occupation in Early Prehistory*

One of the main elements in prehistoric research is the study of settlement patterns. In the last five decades, stemming partially from Binford's research on the topic, the idea of settlement is based on site typology, including the traditional residential and logistic concepts. The latter is certainly marked by the notion of short-term occupation. This concept, used freely by many archaeologists, tends to rely on two main ideas—that of an occupation lasting a short span of time, and subsequently resulting in a limited amount of material culture. Our aim, based on various archaeological case studies from the Stone Age records of Portugal and Mozambique is to show that neither idea is necessarily correct (i.e., there may be short-term occupations with the production of large amounts of artifacts such as lithic workshops; there might be very small collections, such as lithic caches, resulting from short occupations but with very long uses of the site; and most times both are hardly differentiated within complex palimpsests). We will present a critical review of the definition of short-term occupation in Prehistory and will try to define both the criteria for definition and the concept of short-term occupation in the archaeological record.

Bicho, Nuno [154] see Goncalves, Celia

Bidmead, Julye (Chapman University)

[136] *Ritual Power and Politics in Mesopotamia*

In times of political and societal instability public ritual acts as a stabilizing force. During the first millennium BCE with the rise and collapse of several powerful empires, ancient Babylonia witnessed much of this political turmoil and instability. Kings of each succeeding empire appropriated long-established Mesopotamian religious ideology to cast themselves as divinely selected rulers. They manipulated the celebration of the akitu, a twelve-day religious New Year's festival, to legitimate and gain popular support for their rule and to stabilize a declining society. Despite the social and economic problems facing a collapsing empire, political power expressed via the religious rituals of the akitu festival, displayed the new ruler's ideology as divinely sanctioned, and therefore normative to Mesopotamian society.

Biehl, Peter F. (SUNY Buffalo) and Arkadiusz Marciniak

[95] *The Entanglement of Nature and Culture in the Neolithic and Chalcolithic of Central Anatolia: The Transition of Çatalhöyük East to West*

Prehistoric communities need to be seen as firmly embedded in their ecosystem and landscape where the nature is a very real factor in the decision making processes. The human-environmental relationship is complex and nonlinear, which different societies shape it in variable ways. Responses to nature are always of social character made of a number of intertwined explicit and implicit elements. They ultimately have far reaching consequences for the condition of any group including a survival in the face of food shortage or lack of critical resources. The entanglement and nature and culture becomes particularly complex in a period of climate change such as the 8.2k cal BP climatic event. This paper argues that how humans respond to climate change plays a crucial part in the formation of society. Çatalhöyük offers a microcosm that may help us unlock some of the key questions surrounding the period of the transition from the East to West mound around 6000 cal BC. By revealing the entanglement of nature and culture on a microscale, the paper aims to investigate the character of this major threshold in the development of Anatolian societies of that period from a hitherto unexplored perspective.

Biehl, Peter F. [371] see Vandam, Ralf

Biggie, Michael [369] see Walden, John

Bigam, Abigail [219] see Breidenstein, Abigail

Bikoulis, Peter [233] see Gonzalez-Macqueen, Felipe

Bill, Cassandra (Middle American Research Institute)

[71] *Material Culture Correlates of Polity Restructuring and Decline: Changes in Ceramic Production and Use at the End of the Late Classic Period in the Copan Valley*

Features of material culture can be actively constructed and transparently manipulated to various sociopolitical ends, with the installation of elaborate monuments and possession of ornate goods making bold statements of power and authority. While other more common elements of material culture may provide perhaps less conspicuous commentary on the "state of the union," they can also be equally symbolic of the conditions under which they were created. This paper examines the material culture (specifically, ceramic) correlates of the Copan polity's decline at the end of the Late Classic period and what specific patterns of ceramic production, distribution and use may reveal about the effects of the sociopolitical, economic and demographic changes that characterize this era of Copan's history.

Bill, Cassandra [39] see Bell, Ellen

Billinger, Michael (Institute of Prairie Archaeology, University of Alberta) and John W. Ives (Institute of Prairie Archaeology)**[339]** *Insights into Prehistoric Footwear Landscapes*

In earlier research, we used Promontory moccasins dimensions to chart predictable relationships concerning moccasin length, foot length, stature and age. A high proportion (83%) of the discarded moccasins in the Promontory caves came from children and subadults. While a discard bias concerning adults males (more likely to discard moccasins outside of domestic contexts) must be acknowledged, the predominance of children and subadults suggested the presence of a growing population, consistent with other data suggesting that Promontory Culture peoples flourished in comparison to their terminal Fremont neighbors. The precision of the Promontory formulae in predicting stature and age from moccasins can be employed in assessing site function for a variety of footwear instances, including the Yukon ice patch moccasin from an area in or near the Proto-Athapaskan homeland, Franktown Cave in Colorado, Kenton Caves in Oklahoma, and Ross Rockshelter and Daugherty Cave in Wyoming. We also contrast our findings with other large assemblages of footwear, including sandals from Antelope House in Arizona. The presence of children or subadults informs our understanding of the nature of different sites, suggesting occupations by small residential groups in some cases and individual larger moccasins consistent with migratory activities like adult male scouting in others.

Billman, Brian (UNC and MOCHE, Inc.)**[147]** *Discussant*

Billman, Brian [222] see Bardolph, Dana

Billo, Evelyn**[273]** *Rock Art Site Protection: Lessons Learned in 50 Years of Trying*

The shared attributes of two successful rock art site preservation projects near metropolitan areas will be discussed. They started with different backgrounds. The Adams School Site (now Chitactac-Adams Heritage County Park) in California was a neglected and vandalized park whose property had been donated. Picture Canyon (now Picture Canyon Natural and Cultural Preserve) in Arizona was neglected State Trust land being used as an illegal dump that needed to be purchased to become a preserve. Both projects benefited greatly from proactive public servants and volunteers who were dedicated to preservation goals. They partnered with Native American communities, documented their resources first, worked with conservators, and held public meetings to educate the stakeholders. They applied for grant funding, met with decision makers on all levels—local, state, and federal, and had perseverance to jump through all legal hurdles. Picture Canyon benefited from a successful National Register of Historic Places nomination, and matching grants from Arizona Growing Smarter and Flagstaff Open Space funds, while Chitactac-Adams benefited from an Intermodal Surface Transportation Act grant. Projects that failed were located within multiple jurisdictions where no one took the lead, had a lack of funds, and/or people who cared.

[273] *Chair***Binder, Michaela (Austrian Archaeological Institute, Vienna), Charlotte Roberts (Department of Archaeology, Durham University) and Neal Spencer (Department of Ancient Egypt and Sudan, British Mus)****[219]** *Life in Times of Change: A Bioarchaeological Perspective on Health and Living Conditions in Upper Nubia in the Late Second and Early First Millennium BC*

With the end of the Pharaonic Egyptian colonial occupation c. 1070 BC and the increasing deterioration of climatic conditions, communities in Upper Nubia faced significant changes, both to the political structure (which may have affected trade networks), and to the agricultural potential of the region (e.g., availability of arable land). This presentation aims to elucidate if, and in what ways, these alterations impacted upon the living conditions of the people in the area, using the skeletal human remains from the cemeteries of the colonial administrative center at Amara West (N = 180). Analysis of markers of physiological stress and disease (stature, orbital changes, dental disease, nonspecific infection, respiratory diseases, endocranial changes, trauma, osteoarthritis), and oxygen and carbon isotopes, are complemented by contextual data drawn from the cemeteries, settlement and surrounding habitat. Despite limitations due to the bias in sample size, a systematic analysis reveals several tentative trends such as decreasing stature, increased levels of osteoarthritis, dental pathologies, pulmonary diseases, post-cranial fractures and higher subadult mortality. Embedded within the environmental, isotopic, historic and archaeological data, they point to an overall degeneration in living conditions of the population reflecting the impact of severe changes to the environmental, settlement structure and subsistence affecting the region.

Binning, Jeanne (California Department of Transportation)**[100]** *Identifying Pressure Flakes in Lithic Assemblages*

Most lithic technologists would agree that pressure flakes cannot be reliably identified in debitage assemblages by their size and morphology. Analysts using fractography have had success identifying pressure flakes by determining crack velocity via microscopic features on the ventral surface. However, this technique is time-consuming and is most successful on glassy materials. Native Americans of the western continental United States, extensively used one pressure flaking technique for 8,000 years. This pressure flaking produces flakes that are diagnostic of the approach. The distinctiveness of these flakes provides a means of identifying pressure flaking in the Holocene archaeological record of the western United States.

Birch, Jennifer (University of Georgia)**[277]** *Settlement Scaling in the Northeastern Woodlands*

In the late precontact Northeastern Woodlands, processes of aggregation, migration, and geopolitical realignment led to the formation of settlements which give the impression of being too large to be called villages but possessed organizational structures associated with segmentary societies. This paper utilizes empirical data generated from Iroquoian community plans to present a study of scaling relationships in Northern Iroquois. The results are then considered in the context of the historical development of Northern Iroquoian societies and ongoing considerations of how settlement scaling theory can be applied to aggregations in middle-range societies which were clearly not urban in scale.

Bird, Douglas [302] see Price, Michael

Birge, Adam (University of Texas at San Antonio)**[396]** *Mapping Lines and Lives at the Sajama Lines, Bolivia: A Model for Ritualized Landscapes*

Ritual trails and geoglyphs in the Andes date back as far as 400 BC and are perhaps best represented in the Nasca lines and the ceques of Cusco. In western Bolivia, the Sajama lines are a network of ritual trails that cover an estimated 22,000 km² and connect pucarás, chullpas, villages, and chapels. Although this ritualized landscape was heavily modified during the Colonial (1532–1820) and Republican (1821–1952) eras, these pathways had prehistoric use by the local Carangas. These lines may have facilitated social and ritual behaviors but also allowed for negotiation of Spanish and Inca colonization. Understanding these pathways and their features and artifacts allows for inferences to be made about the creation and change of social, political, and ritual life. In this paper, I present a model for investigating the material remains of the Sajama lines that would allow it to be comparable to other ritualized landscapes. This model was based off of a pilot project in 2015 where I identified and surveyed a group of nine ritual pathways around the mountain of Nevado Sajama. This model will be applied to a larger sample of the Sajama lines in future fieldwork.

Birkmann, Joseph and Michael W. Graves

[346] *Resiliency in Hawaiian Irrigated Agricultural Systems: A GIS Approach*

Precontact Hawaiian agriculturalists created irrigated cropping systems of considerable complexity across all of the Hawaiian archipelago. While many of these systems are concentrated in short but broad alluvial valleys, the windward coast of the big island of Hawaii presents a unique hydrological landscape. Here the geologic youth of the island presented Hawaiian agriculturalists with a landscape dominated by relatively small, narrow gulches with limited space for cultivation and a propensity for flooding. This paper examines issues of resilience and stability in small-valley irrigated agricultural systems using high-resolution lidar data and advanced techniques in GIS-based hydrological modeling. We will attempt to evaluate the role of extreme flooding events in influencing decision making and maintenance needs within the various drainages of the windward Kohala peninsula. In doing so we emphasize the utility of adopting a regional approach to landscape based analysis, as well as the analytic possibilities of high resolution GIS data for assessing ecological resiliency in agricultural systems.

[346] *Chair*

Birkmann, Joseph [302] see Graves, Michael W.

Bischoff, Robert (Brigham Young University)

[155] *A Spatial Analysis of San Juan Red Ware Using Least Cost Paths*

A fundamental part of interaction is distance. Distance can be calculated in many ways. GIS applications allow the calculation of least cost paths between locations. Often the length of this path is used as the distance between points; however, the amount of time it takes to traverse a path may differ for paths with the same length that traverse different topography. In this poster, I use the distribution of San Juan Red Ware in a portion of the southwestern United States to examine the differences between using Euclidean distance, the length of least cost paths, and the length in time of least cost paths. San Juan Red Ware was produced in southeastern Utah between approximately AD 750 and 1100 and was widely traded.

Bischoff, Robert [181] see Lambert, Spencer

Bishop, Katelyn (University of California, Los Angeles), Samantha Fladd (University of Cincinnati) and Adam Watson (American Museum of Natural History)

[192] *Social-Ceremonial Organization, Ritual Practice, and Ritual Use of Fauna in Chaco Canyon, New Mexico*

Chaco Canyon, located in northwestern New Mexico, is widely believed to have formed the religious, economic, and political core of a large regional network that thrived during the Pueblo II period. However, debate continues to surround Chacoan ceremonial and sociopolitical organization. One approach to understanding the social-ceremonial organization of Chacoan great houses is through an understanding of the nature of ritual practice and the scales at which it was organized. Pueblo peoples, past and present, have incorporated animals into ritual practice, with a special emphasis on avian fauna. Given the well-documented ceremonial importance of animals, explorations of the use, treatment, and spatial distribution of their remains can inform researchers' understandings of past ritual behavior. This poster examines ritual practice through an analysis of articulated faunal burials and avifaunal remains at several great house sites in Chaco Canyon. Relying upon excavation records made available through the Chaco Research Archive, we investigate the nature and significance of these remains, their associated materials, and architectural settings. Through the consideration of the differential contents and contexts of structured deposits containing faunal material, we address the flexible negotiations of social relationships that existed at great house sites in Chaco Canyon across space and time.

Bishop, Ronald L. (Smithsonian Institution), Dorie Reents-Budet (Smithsonian Institution) and Kathryn Sampeck (Illinois State University)

[39] *Cream Wares of the Southeast Maya Periphery*

Since publication on the compositional analyses of Copan ceramics by Bishop and Beaudry in 2004 several scholars have addressed the manufacture and distribution of cream wares similar to those that are found at Copan. The additional accumulation of data usually results in more insights and better source attributions, but at times the complexities of compositional analysis can mislead interpretation. This paper presents highlights of greatly extended sampling and uses a geochemical perspective to assist in the modeling of the compositional patterns. This results in a more accurate attribution of manufacturing location.

Bishop, Ronald L. [125] see Moriarty, Ellen

Bisson, Michael (McGill University)

[146] *Paleolithic Survey on the Upper Luangwa Valley, Zambia*

The northern half of the Luangwa Valley, Zambia, a southern branch of the East African rift system, is archaeologically unexplored territory in an area that may have served as an important biogeographic corridor between eastern and southern Africa during the Plio-Pleistocene. This paper summarizes the first systematic survey in this region. Paleontological reconnaissance in 2013 incidentally revealed multiple Paleolithic sites which may range from the Acheulian through the MSA. Representative artifact samples from sites are described, their age estimated based on techno-typological criteria, and the potential of the area for future excavation and/or landscape archaeology is assessed.

Bisulca, Christina (Detroit Institute of Arts), Brunella Santarelli (Metropolitan Museum of Art) and Nancy Odegaard (Arizona State Museum)

[105] *Characterization of Minerals on Hohokam Palettes*

Hohokam palettes are a unique artifact found at several important sites in southern Arizona. The Arizona State Museum (Tucson) has an extensive collection of Hohokam palettes from Gila Bend dating from the Santa Cruz and Sacaton periods (AD 850–1150). Most of these palettes have white lead-containing minerals on the surface. This project aimed at characterizing the composition and isotope signatures of these minerals using noninvasive and minimally destructive methods, including multi-collector ICP-MS, XRF, Raman spectroscopy, and VP-SEM/EDS. The lead-containing accretions were

characterized as a mixture of ground galena ore with white clay and/or calcite, and several explanations for this will be discussed. Isotopic analysis of the lead on the palettes indicates that the same lead source was exploited throughout the region; lead from this same source was also found at Valshni Village, a Hohokam site in southern Arizona, indicating movement of lead throughout the region. There have been many proposed uses for palettes in Hohokam culture. This mineral identification supports Haury's early theory that these palettes were used for pigments.

Bisulca, Christina [104] see Pool, Marilen

Biton, Rebecca [389] see Sharon, Gonen

Bitowf, Ashley [273] see Rodrigues, Teresa

Biwer, Matthew (University of California, Santa Barbara)

[230] *Preliminary Results of Paleoethnobotanical Analysis at Quilcapampa, a Middle Horizon site in Arequipa, Peru*

In this poster I present preliminary results and interpretations of paleoethnobotanical investigations at the site of Quilcapampa, located in the Siguas Valley, Department of Arequipa in south-central Peru. Recent AMS radiocarbon dates indicate Quilcapampa was occupied for a short period during the mid-eighth century AD, which places the site within the Middle Horizon (AD 600–1000). Based on site architecture and ceramic evidence, the site may represent a colonial installation of Wari Empire (AD 600–1000) in the region, though further analysis is needed to characterize the relationship between residents of Quilcapampa and the Wari Empire. As relatively little is known about Middle Horizon foodways in the Siguas Valley, this poster provides preliminary macrobotanical (desiccated/carbonized plant remains) and microbotanical (starch grains and/or phytoliths) data excavated during the 2015 summer field season. While these results are preliminary, they represent a first step in characterizing knowledge of Middle Horizon foodways for the region and may add to our understanding of Wari foodways and colonialism.

Blaber, Thomas, Nicholas Triozzi (American Museum of Natural History) and Anna Semon (American Museum of Natural History)

[365] *Mica Symbolism from a Late Irene Mortuary Site*

Recent excavations at the Fallen Tree Mortuary Complex (9Li8) on St. Catherines Island, GA have recovered over 20 shaped mica artifacts and dozens of fragments associated within three Late Mississippian adult male burials. This nonlocal material was purposely shaped and interred with the individuals. In this poster, I will discuss what the symbolism of the mica and examine the location and orientation of the mica discs on the individuals. In addition, I will compare the mica to several other artifacts types that may have overlapping symbolism within the site.

Blaber, Thomas [365] see Triozzi, Nicholas

Black, Stephen L. (Texas State University, San Marcos) and Charles W. Koenig (Texas State University)

[21] *Investigating Hunter-Gatherer Earth Oven Intensification: a view from the Lower Pecos Canyonlands*

Foraging societies in the semiarid Lower Pecos Canyonlands of southwestern Texas intensified the use of desert succulents over a span of 9,000 years or more for food, fiber, and other uses. Food plants including Agave lechuguilla, sotol, and prickly pear were baked in earth ovens with stone heating elements, an iterative process that left massive residual by-product in the form of fire-cracked rocks and burned and unburned plant refuse in and around baking facilities. The archaeological signatures of earth oven cookery are pervasive and found in almost all settings in the region including open sites in the uplands and river terraces and protected rockshelters in the canyon walls. We have developed a systematic strategy focusing on stratigraphic excavation, 3D modeling, rock quantification, geoarchaeology, radiocarbon dating, and macrobotanical identification to document earth oven cookery at two dry and two wet rockshelters in Eagle Nest Canyon, a short box canyon off the Rio Grande. The resulting data offer an unparalleled look at this characteristic form of landscape intensification. This presentation highlights the archaeological context, our methodological approach and results to date.

Black, Stephen L. [126] see Lawrence, Ken

Blackmore, Chelsea (University of California, Santa Cruz)

[318] *Activist Archaeology and Queer Feminist Critiques in Mesoamerican Archaeology*

One of the strengths of prehistoric archaeology is its ability to document the full range of human variation. For Latin America, activist archaeology has the potential to inform postcolonial and Third World feminist critiques that challenge white supremacist legal systems that marginalize women of color and indigenous peoples. The false universalisms and cultural essentialisms found in human rights debates ignore the diverse experiences of women's oppression, especially the indigenous, poor, rural, disabled, and queer. Hegemonic models of the Mesoamerican past naturalize the oppression of women by employing colonial narratives regarding sex, gender and sexuality. The advocacy and activism of present day feminist archaeologists focus on decolonizing the discipline by documenting the fluid and contextual nature of precolumbian sex/gender systems, and demonstrating the agency and power of indigenous women in politics, religion and reproduction. In this paper, we ask the following questions: how do modern assumptions around sex, gender and sexuality find their ways into archaeological discussions of ancient Mesoamerican states? How do these narratives then become naturalized into discourses that perpetuate homophobic, sexist and racist legal systems? How can activist archaeology in Latin America both transform the discipline and potentially inform modern political debates?

[19] *Discussant*

Blackwell, Bonnie A. B. [181] see Dakovic, Gligor

Black Wolf, Michael (Tribal Historic Preservation Officer)

[295] *Discussant*

Blackwood, Alex [40] see Mackay, Alex

Blair, Susan [17] see Holyoke, Kenneth

Blair, Elliot (University of Alabama)

[379] *Linking Beads, Linking People: A Social Network Approach to Exploring Identity in the Colonial Southeast*

Beads and other ornaments were important objects involved in early colonial entanglements between Europeans and Native Americans, with the color, texture, and physical properties of these objects fostering the embodiment of new social roles within changing colonial worlds. In this paper I discuss how such objects were involved in the material manifestation of social identities as pluralistic native communities aggregated in the Spanish missions of La Florida. Looking specifically at the aggregated population of Mission Santa Catalina de Guale, a seventeenth-century mission located on St. Catherines Island, Georgia, I use the methods of social network analysis (SNA) to explore how mission neophytes utilized European glass trade beads to both foster the persistence of social identities and to create new communities in the context of population aggregation. Presenting a bipartite network reconstruction of the Santa Catalina community, I discuss how both individuals and objects of adornment acted together to materialize changing colonial identities.

Blakeslee, Donald (Wichita State University)

[345] *Etzanoa: A Northern Caddoan Town*

Documents associated with the Juan de Oñate expedition of 1601 allow identification of the proto-Wichita (Quiviran) town that he visited. Described by natives as taking two or three days to walk through, the Spanish saw only parts of it. Still, they counted 1,700 to 2,000 houses in the southern end of the community, which was described as about two leagues (five miles) long. Above that point, the Spanish traveled away from the river for another three leagues, and when scouts returned to the river, they reported that the town "continued on" upstream. Today, the archaeological record of the town consists of over 25 separate recorded sites strung along about 14 river miles, with unsurveyed ground between them. The town consisted of clusters of houses 30 to 40 houses each, separated at distances of 300 to 400 paces by agricultural fields. Survey between recorded sites has begun, and eventually it may document this as the largest prehistoric site in the United States.

Blanchard, Morgan R. [257] see Baxter-McIntosh, Jill

Blanco, José [134] see Vidal Montero, Estefania P.

Blanton, Richard (Purdue University)

[324] *Collective Action in State Building, Past and Present*

I report on a comparative study of degrees of collective action in 30 premodern states and 30 contemporary nation-states. Contrary to the notion of democratic reform in state-building, I found roughly similar proportions of more and less collective (autocratic) states in the two samples. I propose a hypothesis for the failure of democratic reform drawn from collective action theory.

[215] *Discussant*

Blanton, Richard [215] see Costa, Angelica

Blasco, Ruth [389] see Rosell, Jordi

Blegen, Nick [389] see Tryon, Christian

Blennerhassett, Thomas (University of Toronto)

[233] *Faces of the Feast: The Spatial Organization of Face-Neck Jars in the Jequetepeque Valley, Peru*

Chicha was consumed in large quantities during social gatherings and feasting events at a number of ceremonial locales including hinterland sites, in the Jequetepeque River Valley, Peru, during the Late Moche. Face-neck jars were used in the brewing and serving of corn beer and depict supernaturals and elite lords with elaborate headdresses and earspools. This research showed the degree to which face-neck jars were standardized in manufacture and design and how this may have contributed to the materialization of a regional Moche identity that possibly transcended sectarian social and political differences. The faces were impressed on the necks of the vessels with the use of one-piece molds and formed part of a shared manufacturing technique in a river valley that was characterized by political and religious decentralization. At San Ildefonso the use of these standardized Moche wares depicting male elites and supernaturals appears to have anchored the feasting rites of separate but possibly confederated communities. This made chicha production central to the political and ritual economies of ancient Andean polities, and the face-neck jars likely symbolized the generosity of local lords who sponsored feasts and religious events.

Bliege Bird, Rebecca (Pennsylvania State University)

[286] *Discussant*

Bliege Bird, Rebecca [302] see Price, Michael

Blitz, John [142] see Porth, Erik

Bloch, Lindsay (UNC-Chapel Hill), Douglas Armstrong (Syracuse University) and Jillian Galle (DAACS)

[370] *Unraveling Global and Local Ceramic Production Networks: An LA-ICP-MS Analysis of Ceramics from Barbados, Jamaica, and Great Britain*

A wide variety of ceramics are recovered in plantation contexts on Barbados and Jamaica, from hand-built coarse earthenwares to refined tablewares, as well as industrial wares for sugar production. The origins for these ceramics are often uncertain. In addition to the importation of ceramics from Great Britain and elsewhere in the Americas, many potters and workshops existed on the islands to produce both quintessentially Caribbean pots as well as European-

style vessels. To better understand this complex history and ceramic distribution, we present the results of elemental analysis of 250 coarse earthenwares from plantations on Barbados and Jamaica, analyzed via LA-ICP-MS. These results demonstrate how ceramic sources for both locally made wares and imported wares changed over time within Trent's Plantation on Barbados, and across multiple plantations on Jamaica. Through this analysis, it becomes possible to visualize the overlapping production networks, from global to exceedingly local, that generated these diverse ceramic assemblages.

[370] *Chair*

Blodgett, Clayton [237] see Krug, Andrew

Blois, Jessica [227] see Pilaar Birch, Suzanne

Blomster, Jeffrey (George Washington University)

[391] *Inscription, Replication, and Production of Olmec Imagery and Regional Identities*

The Early Formative period exhibits dramatic transformations in imagery and identity throughout Mesoamerica. Focusing on a time period before techniques for mold made and mass produced objects had been achieved, this paper explores replications that involved copies, iterations, and emulations of designs and imagery. At select sites in Mesoamerica, objects have been documented with Olmec-style imagery, some of which have been linked to the Gulf Coast Olmec society; in most cases, the Olmec imagery forms a minor component within a larger panorama of regional design systems. Excavation data from Etlatongo, in the Mixteca Alta of Oaxaca, Mexico, contribute to understanding the cultural impact of the replication of imagery by looking at four classes of ceramic data: vessels, figurines, masks, and cylinder seals. Focusing on contrasts between imported originals and locally made replicas revealed through chemical compositional data, this paper explores the various techniques deployed to craft imagery and the media through which different designs were inscribed on objects and bodies, exploring the salient impacts on social identities. While some objects could have been employed for the mass replication of imagery, in other cases, imagery and identity were constructed and negotiated through more variable and contested means and techniques.

Blomster, Jeffrey [293] see Salazar Chavez, Victor Emmanuel

Blong, John (Texas A&M University)

[371] *Prehistoric Landscape Use in the Upper Susitna Basin*

This paper presents the geomorphological and paleovegetation record of the upper Susitna River basin in the central Alaska Range, and discusses late Pleistocene and Holocene landscape and vegetation change and how this affected human use of this upland landscape. Geomorphological data suggest that the last significant glacial ice sheet covering the upper Susitna basin receded by 14,000–13,000 cal BP. Following deglaciation, there is evidence for high-energy aeolian activity spanning the late Pleistocene and early Holocene. There are at least three Holocene tephra falls recognized in the upper Susitna basin. Initial human occupation occurred by 11,000–10,500 cal BP, at least 2,000 years after the end of full glacial conditions, and 1,000 years after first evidence of landscape recovery. Initial early Holocene use appears to have been ephemeral, but human activity in the study area intensified in the middle and late Holocene as modern vegetation patterns were established. There are preliminary indications that vegetation may have been affected by Holocene tephra fall. There is evidence for a hiatus in human occupation of the upper Susitna region during the middle Holocene, but it is unclear whether this was directly related to tephra deposition, or broader climate instability during the Neoglacial Period.

Blong, Russel [77] see Riede, Felix

Blue, Kathleen (Department of Anthropology, Minnesota State University, Mankato)

[120] *Migration and Interaction in the Epiclassic of the Tula Region: Preliminary Data as Evidenced by Dental Nonmetric Analysis*

Dental nonmetric data provide a means for the analysis of genetic affinities and relationships of individuals, and can therefore be used to reconstruct past migration and interaction patterns, both within and between sites. The dental traits of 16 individuals, along with 21 individual teeth, from Cerro Magoni, an Epiclassic site in the Tula region, were collected in this preliminary analysis. Additionally, 13 individuals from two Xajay sites, El Zethe and Huesamenta, were also assessed. The collected traits are previously defined dental nonmetric traits of the deciduous ($n = 8$) and permanent ($n = 29$) teeth. Teeth are ideal for this type of assessment as they are more likely to be preserved and are under tighter genetic control than the cranium or postcranium, and are less prone to environmentally induced variation. Multivariate analysis of principal components (PCA), following Irish and Guatelli-Steinberg (2003), provides the clearest picture of genetic relatedness, or lack thereof, among the individuals/sites in this study. In addition to the nonmetric analysis, data on the dental health of the individuals will also be presented. Very little evidence of stress-related dental enamel hypoplasia was present, but several individuals suffered from significant periodontal abscesses. Evidence suggesting extra-masticatory activities involving the teeth was also common.

Boaretto, Elisabetta (D-REAMS Radiocarbon Weizmann Institute of Science), Bridget Alex (Department of Human Evolutionary Biology, Harvard), Valentina Caracuta (D-REAMS Radiocarbon Laboratory, Weizmann Institute), Eugenia Mintz (D-REAMS Radiocarbon Laboratory, Weizmann Institute) and Lior Regev (D-REAMS Radiocarbon Laboratory, Weizmann Institute)

[338] *The Early Upper Paleolithic Radiocarbon Chronology and Its synchronization in the Levant*

The timing of Early Upper Paleolithic (EUP) traditions in the Levant bears significance for understanding modern human dispersals. Despite intensive research, the Levantine EUP chronology has not been resolved because most chronometric dates come from old excavations and outdated analytical methods. Here we report dates from Manot Cave, Israel, which constitute the largest series of EUP radiocarbon dates ($n = 55$) from current excavations and state-of-the-art analytical methods. A new strategy in the field and in the lab was applied in order to cover context variability and possible contamination. The new dates set some constraints on models of migrations and technological diffusion between the Levant and Europe.

Boaretto, Elisabetta [338] see Caracuta, Valentina

Bobolinski, Kathryn (University of Montana)

[50] *A Zooarchaeological Analysis of Housepit 54 at the Bridge River Site (EeR1), Middle Fraser BC*

Housepit 54 at the Bridge River pithouse village in south-central British Columbia provides a glimpse into the complex cultural practices that occurred at this area in the past. This village, which includes approximately 80 semi-subterranean structures, was occupied during four periods, approximately 1800–1600 cal. BP (BR 1), 1600–1300 cal. BP (BR 2), 1300–1000 cal. BP (BR 3), and 610–45 cal. BP (BR 4), firmly placing the site within both a historic and a precolonial context. It is situated in the Middle Fraser Canyon region of the Canadian Plateau, which encompasses the Fraser and Bridge

Rivers as well as the adjacent talus slopes, terraces, mountains and high valleys. The Mid-Fraser offers a plethora of fauna that could have been exploited spanning fish to large ungulates. This study incorporates data from the 2013–2016 excavations at Housepit 54 to examine the zoological remains in order to test alternate hypotheses regarding relationships between animal predation, processing strategies, household population and social dynamics.

Bobolinski, Kathryn [50] see Tifental, Emilia

Bocherens, Hervé (University of Tuebingen), Dorothée Drucker (University of Tuebingen, Germany), Martina Láznicková-Galetová (University of West Bohemia, Czech Republic), Mietje Germonpré (Royal Belgian Institute of Natural Sciences, Bruss) and Christoph Wissing (University of Tuebingen, Germany)

[284] *Isotopic Tracking of Trophic Relationships (Predation, Competition, Commensalism) between Paleolithic Humans and Predators*
Predators are usually considered not so informative in zooarchaeological investigations, except when their bones carry cutmarks. They are more viewed as a disturbing factor for the bone assemblage. However, tracking their paleoecology using stable isotopes in their bones can yield valuable information on several key aspects of their relationships with paleolithic human populations. Especially carbon and nitrogen stable isotopic composition in bone collagen of predators compared to those of humans and the available prey species can be used to quantify proportions of consumed prey through Bayesian mixing models. This novel approach allows an evaluation of competition or niche partitioning between large predators such as wolves, cave lions and cave hyenas, and Neanderthal or modern humans between around 50,000 and 8,000 years ago. Moreover, the possibility to determine which predator had access to which prey can tell us about availability of large mammal carcasses, in the case of mesopredators unable to hunt large prey themselves, and possibly document cases of commensalism between small predators (e.g., fox, wolverine) and human settlements. Finally, stable isotopic investigations can provide a crucial contribution to the debate about domestication of wolf during pre-LGM Paleolithic in central Europe.

Bocherens, Hervé [127] see Germonpré, Mietje

Bocinsky, Kyle (Crow Canyon Archaeological Center)

[227] *"Constraint and Freedom" in the Era of Big Data*

Twenty-seven years ago, Bruce Trigger presented a "new synthesis of archaeological explanation," seeking to harmonize neo-evolutionary explanations dominant in the 1970s with sociohistorical perspectives of the 1980s. Central to his thesis was the distinction between "external" constraints that structure human agency independent of humans themselves, and "internal" constraints that are historically and culturally constructed. Here, I critique Trigger's formula by acknowledging that even external constraints have histories, and I propose a useful classification of structural constraints as "static," "dynamic," and "complex." The Era of Big Data in archaeology has enabled us to identify and test the importance of structural constraints on human behavior at unprecedented spatial and temporal scales and across traditional cultural boundaries. As an example, I present new data that define complex structural constraints on maize agriculture in the southwestern United States and northwestern Mexico—the evolution of traditional maize landraces—and I attempt to use these data to track the relationships between contemporary and ancestral Pueblo people via their corn. These data are presented as part of SKOPE—Synthesizing Knowledge of Past Environments—an initiative to deliver "big" paleoenvironmental data to researchers and the public.

[112] *Discussant*

Bocinsky, Kyle [27] see d'Alpoim Guedes, Jade

Bocinsky, Kyle [142] see Lipe, William

Boczkiewicz, Roberta (MOCHE Inc.) and Jean Hudson (University of Wisconsin-Milwaukee)

[232] *Otolith Metrics and Fishing Strategies on the North Coast of Peru*

In this paper I compare Otolith metrics from two coastal sites in the Moche Valley, Gramalote and Cerro La Virgen. This comparison is aimed at evaluating possible shifts in fishing strategies as reflected in the range and normative values of fish size over time. Gramalote is a small politically autonomous fishing village occupied during the Initial Period. Cerro La Virgen is a large town occupied as part of the expanding political empire of the Chimú during the Late Intermediate Period. The two sites, located 6 km apart in space and 2,500 years apart in time, had access to the same marine habitats. I will review and illustrate both ecological and political interpretations of chronological variation in fish size at the two ends of the Andean chronological sequence.

Boczkiewicz, Roberta [232] see Hudson, Jean

Boeda, Eric (Professeur), Christine Hatté (L.S.C.E. UMR CEA-CNRS-UVSQ 8212), Michel Fontugne (L.S.C.E. UMR CEA-CNRS-UVSQ 8212) and Christelle Lahaye (UMR 5060 CNRS-IRAMAT-CRP2A)

[226] *Attempt of Modelization of the First Settlements in America at Pleistocene Based on the New Archaeological Sequences in Piauí (Brazil)*

The research our teams are conducting in the park of Capivara in Brazil since 2008 lead to reveal 6 new Pleistocene archaeological sequences. The sites are all located within a 20 km area and stem from different sedimentary and topographic environments including open air, rockshelter, cave at the bottom of cuesta, or in karst. Each of the sites shows different sedimentary sequences, including different archaeological horizons and different typotechnical compositions. The dating that we have obtained by crossing C14, TL, and OSL data lead us to identify accurately each of these archaeological sites, hence permitting to attempt a comparative approach with the major climate changes observed during the isotopic states 2 and 3. Based on this study, at a large-scale reading, there is no evidence of a correlation between major climate changes and periods of occupation. Nevertheless, we can notice a concordance of vacancy within the group of investigated sites. Technically, those vacancy periods correspond to clear technical changes. All those observations reflect the fact that our region of research witnessed different Pleistocene occupations beginning from isotopic states 2 and 3.

Boeka-Cannon, Molly [181] see Owens, Andrew

Bogemans, Frieda, Rindert Janssens and Cecile Baeteman

[356] *Unearthing Holocene Lowland Landscapes as Tool to Detect Archaeological Sites: A Case Study from Lower Khuzestan (SW Iran)*

Over the past century archaeological research in Upper Khuzestan has shown a long history of settlements in the alluvial plains. The Lower Khuzestan plain has barely been studied with research has been restricted to superficial surface surveys. The nearby presence of the Persian Gulf and the downstream parts of the rivers Karun and Jarrahi, the first one being the largest river in Iran, offer great potential for human settlements and activities. In lowlands, however, processes of sedimentation inevitably bury former landscapes, and therefore make geological investigations crucial for understanding the location of archaeological sites. Knowledge of the processes provides insights into the environmental nature, the impact of geomorphological events, and the chronological framework. The southwestern part of the Khuzestan plain, northeast of Khorramshahr will be presented as case study. The study shows the effects of both terrestrial and littoral processes on the nature of the sedimentary environments, the influence of the Holocene transgression on the sedimentary environments and, the effect of external forces on the dynamics of the sedimentary systems and landscapes.

[356] Chair

Boileau, Arianne (University of Florida)

[85] *Testing the Robustness of NISP and MNE: Results of a Blind Test*

Archaeozoologists generally consider that counts are replicable data accurately representing the initial abundances of elements, individuals or taxa. However, few studies have examined these assumptions with control data. To test the robustness of NISP (Number of Identified Specimens) and MNE (Minimum Number of Element) counts, we conducted a blind test that involved the analysis of two large experimental samples composed of known red deer (*Cervus elaphus*) and cattle (*Bos taurus*) elements. The two samples differ in fragmentation levels, ranging from simple marrow extraction to extensive comminution for bone grease rendering. Our results suggest that NISP and MNE are accurate and replicable measures of abundance for whole assemblages and for samples limited to non-long bones, even at the ratio scale. However, when analyses were restricted to long bones or long bone portions, both quantification methods poorly predicted abundances, including the ordinal level. Moreover, the blind test indicates that MNE is more robust at predicting skeletal abundances than NISP. The poorer performance of NISP in the blind test probably results from substantial variations in rates of long bone fragmentation and identification.

[85] Chair

Boileau, Arianne [85] see Morin, Eugène

Boisvert, Richard (NH Div. of Historical Resources)

[16] *Settlement Organization of Paleoindian Caribou Hunters: Inferences from the Israel River Complex, Jefferson, New Hampshire*

A long-term research project in northern New Hampshire has identified nearly 20 Paleoindian components within a 1 km by 0.5 km space overlooking the Israel River. Consideration of the spatial distribution of tools and debris within the components and the distribution of these components on the landscape suggest a rigorous organization of migrating bands of Paleoindians who focused on caribou hunting. Site specific topography appears to be an essential element in the selection and use of various components in the cluster of sites

Boivin, Nicole (Max Planck Institute for the Science of Human History), Mary Prendergast (St. Louis University Madrid), Jillian Swift (Max Planck Institute for the Science of Human History), Ceri Shipton (University of Oxford) and Alison Crowther (University of Queensland and Max Planck Institute)

[32] *Island Colonization and Ecological Transformation in Prehistoric Eastern Africa*

Until recently, the small islands lying off the coasts of Tanzania and Kenya have seen little systematic archaeological investigation. Their biogeographic diversity, reflecting various processes and chronologies of formation, nonetheless offers an ideal opportunity to examine processes of prehistoric colonization and anthropogenic impact. We explore the earliest evidence for human activity on three different islands, Pemba, Zanzibar and Mafia, and provide the first evidence for early human alterations of these island ecosystems. While the datasets remain preliminary, we are able to show that the types of anthropogenic impacts also seen on other regional island systems, including extinction, extirpation and habitat alteration, were also a feature of early settlement in island east Africa.

Boivin, Nicole [284] see Janzen, Anneke

Bokhimi, Xim [145] see Jaimes Vences, Gustavo

Bolaño-Martínez, Nataly, Oscar Uriel Mendoza-Vargas (Posgrado en Ciencias Biológicas, UNAM) and Erika Lucero Robles Cortés (Proyecto Templo Mayor, Séptima Temporada)

[225] *Analysis of Elasmobranchs from Offerings 126, 141 and 165 Found at the Great Temple of Tenochtitlan*

Numerous fish from diverse species have been found inside the Great Temple offerings. These were transported from the coast to Tenochtitlan. During the seventh field season of the Templo Mayor Project, five sawfish rostra were found inside three offerings. By analyzing macro and microscopic structures, and through the comparison with modern specimens from the Ichthyology Collection of the Institute of Marine Sciences and Limnology, at the National Autonomous University of Mexico, these animals were identified as *Pristis pectinata* y *Pristis pristis*. Nowadays, these fish are distributed in the Gulf of Mexico, the Caribbean coast and the Mexican Pacific Ocean. Individuals selected by the Mexica priest were adults, measuring almost 4 m long. Contemporary specimens are no longer of this size, since the species is in critical danger of extinction, worldwide. Through a biological and an archaeological analysis, this paper contributes to getting a better understanding of elasmobranch biodiversity during prehispanic times, as well as their use, symbolism and importance.

Bolnick, Deborah [344] see Hard, Robert

Bond, Julie [224] see Maher, Ruth

Bondura, Valerie (Columbia University)

[265] *Frontiers in Center Places*

Borders often imply two-dimensional lines on a map, a naturalized "over here" and "over there." This is reified in places where political boundaries appear to follow ecological ones. But the nature of these lines, even apparently clear environmental ones, is always arbitrary, and the recognition of

these lines is always dependent on subject position. The word "frontier" highlights this politics of definition and recognition; frontiers are defined in history and anthropology as the edges of colonial projects, and thus frontiers are recognized and experienced differentially. Drawing on several seasons of fieldwork in northern New Mexico, I discuss the ontological problem at the heart of studying ecological and political frontiers in archaeology. I seek to understand how ecological and cultural difference across space was conceptualized and experienced by examining a location that was a frontier for some (Spanish, American) and a center place for others (Pueblo, Jicarilla Apache, vecino). I look to historic ceramics and other materials to understand how the Sangre de Cristo Mountains along the Rio Grande Gorge corridor were simultaneously a border and a center, and suggest that these archaeological remains speak to the inherent tension in the overlap of marginal/central places.

Bone, Christopher (University of Oregon) and Ha Beom Kim (Department of Anthropology, University of Oregon)

[24] *A Landscape-Scale Spatial Analysis of Neolithic Settlement Patterns in Jeju Island, Korea*

Intensive archaeological research in Jeju Island, Korea, conducted over last three decades have produced a rich set of spatial data on archaeological sites and feature distributions across the island. While these spatial data have high potential for improving archaeological understanding of past human activities, a systematic analysis of spatial data from Jeju has yet to be fully undertaken by archaeologists. In this study, we employ spatial analysis on high-resolution topographic data to enhance our understanding of landscape-driven subsistence strategies and settlement patterns. While we limit our scope to Neolithic data for this study, we anticipate that spatial analysis will contribute to a long-term understanding of human-environmental interactions on the island.

Bongiovanni, Rosie [267] see Watkins, Tia B.

Bonham, Katie McHugh, Christyann M. Darwent (University of California, Davis) and John Darwent (University of California, Davis)

[257] *A Thousand Years of Bone-Tool Production at Shaktoolik, Alaska*

Osseous tools and debitage collected from three middens at the Shaktoolik Airport site during excavations in the summers of 2014 and 2015 were analyzed using the chaîne opératoire rather than a typological approach to assess site use over time. Relative frequencies of raw materials, tool types, and production debris were analyzed from different periods. The Early Thule/Proto-Yup'ik portion (ca. AD 1200) of the assemblage came from a midden associated with a men's house (qasgiq), and is characterized by high relative frequencies of specialized tools production debris. Samples from later midden deposits had considerably less manufacturing debris than the men's house. Midden samples from Late Thule/Proto-Yup'ik (ca. AD 1400–1600) are lacking in sea-mammal bone as a raw material but have a high relative frequency of caribou bone and antler. However, Late Prehistoric Yup'ik samples (ca. 1700–1800) have high frequencies of sea-mammal bone for tool production. This difference was initially hypothesized to be the result of climatic changes, but more likely is due to differences in the season of occupation. The Historic Iñupiaq midden sample has a lack of hunting/fishing tools but presence of more exotic materials and nonutilitarian objects, which is likely associated with Russian-American contact.

Bonneau, Adelphine (Université Laval/CELAT), Réginald Auger (Université Laval), Bernard Gratuze (IRAMAT, Centre Ernest-Babelon) and Jean-François Moreau (Université du Québec à Chicoutimi)

[178] *Trading around the Saguenay River (Sixteenth and Seventeenth Centuries): New Insights from Trade Glass Beads Typology and Chemical Analysis*

Hundreds of pounds of glass beads were imported among other goods by European traders to exchange with First Nations communities and to acquire fur, during the sixteenth, seventeenth, and eighteenth centuries. Once traded, these beads were used as bracelets, necklaces, cloths ornament, etc., or bartered with other Native groups. Nowadays, thousands of these beads are found on archaeological sites in Canada and can be a privileged tool to investigate trade networks in North America. As a starting point, the Saguenay River area (from Tadoussac to St John Lake) has been chosen. Beads from trading posts (Chicoutimi, Metabetchouan, Ashuapmushuan) and from Amerindian settlements (Ashuapmushuan River, Anse-à-La-Croix, Ste-Maguerite River) were classified according to available typology and analyzed with microscopy, Raman spectroscopy, LA-ICP-MS, and LIBS (Laser Induced Breakdown Spectroscopy) to reconstruct trading networks from Europe to Quebec, and around the Saguenay River. Preliminary results indicate a diverse provenance of imported glass beads (France, Germany, Italy) and obvious relationships between trading posts and local Native sites. How were the beads chosen by the Europeans? To meet Native people "fashion" tastes? Were there different qualities of glass? This study can only provide preliminary answers but emphasizes the diversity and complexity of trading in New France.

Bonneau, Adelphine [178] see Auger, Réginald

Bonorden, Brooke [280] see Kilgore, Gertrude

Bonsall, Clive (University of Edinburgh) and Adina Boroneanț (Senior Researcher, Romanian Academy Institute of A)

[68] *Filling the Gap: Caves, Radiocarbon Sequences, and the Meso-Neolithic Transition in SE Europe*

Radiocarbon sequences from some cave sites in the Balkan and Italian peninsulas show a temporal gap between Mesolithic and Neolithic occupations. Some authors have seen this as a regional phenomenon and have sought to explain it in terms of a general population decline in the late Mesolithic, which facilitated the replacement of indigenous foragers by immigrant farmers. In this paper, we reexamine the evidence and consider alternative explanations for the Meso-Neolithic "gap," focusing on taphonomic, economic, social, and ideological factors.

Booher, Ashley (Texas Tech University) and Brett A. Houk (Texas Tech University)

[11] *Peri-abandonment Deposits at Chan Chich, Belize*

This poster details peri-abandonment features from the Maya site of Chan Chich in northwestern Belize. The term peri-abandonment relates to deposits or features dated to around the time of abandonment of the site. Previous research in the southern and eastern lowlands has documented widespread above-floor terminal artifact deposits in primarily epicentral contexts thought to have formed at or near the time of abandonment at many sites in the region. Excavations at Normans Temple complex at Chan Chich in the late 1990s encountered above-floor terminal deposits at the base of Structure C-1 and on the steps of Structure C-2. Excavations conducted in 2016 uncovered two additional features—an above-floor artifact deposit and graffiti on a wall in a collapsed room—at the Normans Temple complex. Both features are thought to have been created near the time of the abandonment of the site.

Boomert, Arie

[384] *Origin of the Pitch Lake: An Amerindian Myth from Trinidad*

Although Trinidad is referred to in various myths of the Warao and Arawak of the Orinoco delta and the Guiana coastal zone, only one mythical tradition is known which was documented among the Amerindians formerly living on the island. Explaining the origin of the major asphalt seepage known as the Pitch Lake in southwest Trinidad, this myth appears to be closely related to part of a mythological cycle related by the Lokóno (Arawak) of Guyana and northwest Suriname which narrates the vicissitudes of Arawanili, the first Arawak shaman, believed to live on an island, kaleri, in primordial times. Besides, there exists a systematic correspondence between the Lokóno myth of Arawanili and the mythological cycle centering on the culture hero Guahayona, recorded by Pané among the 'Taíno' as early as the 1490s. Clearly, the 'Taíno' myth is derived from the Lokóno one or, more likely, from a prototype to both. They illustrate the close relationship, most likely going back to Saladoid times, between the cosmological views of the Lokóno (Arawak) of the mainland and the 'Taíno' of the Greater Antilles.

Boonlop, Korakot [276] see Newton, Jennifer

Booth, Donald

[283] *The Mitchell Site: An Upgrade*

In the spring of 2015, SCI Engineering, Inc. was contracted to conduct archaeological investigations ahead of the expansion of the Cedar Creek Lumberyard situated in the northeast portion of the Mitchell site (11MS30) in Madison County, Illinois. These investigations resulted in the delineation of multiple wall trench structures of varying size and shape. Most of what is known of this important Mississippian mound center comes from James W. Porter's dissertation on his 1960s salvage excavations at Mitchell ahead of the construction of an interstate highway that ultimately destroyed all but two of the ten mounds at the site. This work, and a small scale investigation in the mid-1970s and minor testing in the 1990s, constitute the extent of modern archaeological investigations previously conducted at the Mitchell site. In an attempt to put the 2015 structures into a broader Mitchell context, an effort was made to bring all of these investigations into a GIS format resulting in an overall site map depicting all of the previous excavations and all of the cultural features that have been identified to date. This GIS mapping project provides opportunities to draw new insights into this major Mississippian center in the northern American Bottom.

Borck, Lewis (Leiden University/Archaeology Southwest) and Leslie Aragon (Archaeology Southwest/University of Arizona)

[74] *Using a Sexualized Ritual Landscape to Ontographically Examine Hohokam Gender Stereotypes*

Between approximately AD 800–1450, politically oriented religious movements flourished and withered throughout the Hohokam world of the Greater Southwest. The public architecture associated with these movements is some of the only remaining evidence that archaeologists have for their occurrence. While researchers have started to investigate how these movements were politically intertwined, in this paper we lay out an argument that their physical remains can also be used to ontographically examine gender stereotypes in the pre-textual past. To do this, we link sexual characteristics embodied by the public architecture of the Hohokam Ball Court Society and the subsequent Platform Mound Society with the structure of each Society's associated social and political organization to approach an ontographic understanding of gender stereotypes during those periods. An intersectional archaeology recognizes that multiple cultural dimensions and categories reflexively impact society at all scales, including at the individual scale. We argue that gender biases can be used to more effectively analyze archaeological data and interpret the experience of individuals who created the archaeological record.

Borck, Lewis [23] see Hedquist, Saul

Boren, Courtney (University of West Florida)

[249] *OSL Dating and Chronology in Pensacola, Florida's Contact Period*

New research on the history of the Pensacola Bay region from the late Mississippian to the Protohistoric period is clarifying previous understandings of cultural sequences. Two recently discovered sites have created opportunities to apply new dating technologies to culture historical questions. The first site is in an incredibly dynamic area of sand dune formations on a barrier island. The second site is associated with the Luna Settlement of 1559–1561 and survives partially intact despite considerable development over the centuries. A relatively new chronometric dating technique known as Optically Stimulated Luminescence (OSL) has been applied to pottery sherds from both sites to explore the sequence of Pensacola's Native inhabitants immediately before and after Spanish contact. Results from these contrasting sites are compared in order to evaluate the applicability of OSL dating in the Pensacola region. Further applications of this data include teasing out the archaeological cultures and identities of some of the native groups living here during the sixteenth century.

Borenstein, Gabrielle (Cornell University)

[221] *Motif and Milieu: Deconstructing the (Re)production of the Kura-Araxes Culture (3500–2400 BC)*

How do material remains—and the imagery that adorns them—inform our understanding of past landscapes? How does knowledge of landscapes enrich our understanding of the objects produced within them? This paper explores the relationship between iconography and environment in the Early Bronze Age Kura-Araxes (3500–2400 BC) culture. The Kura-Araxes was arguably the most widespread archaeological horizon in the ancient Near East, extending from the Caucasus to the Levant to the Zagros Mountains. Marked by a common material assemblage, research to date has prioritized the degree of uniformity and geographical extent of the culture across the diverse topography. Using new data from the site of Gegharot in Armenia as a lens, this paper quantitatively and qualitatively investigates the relationship between motif and milieu. It examines the imagery present on ceramic vessels, plaques, and hearths as a means not only of assessing regional variability throughout the ecumene, but also of deconstructing the co-constitutive nature of people, pots, places, and politics. Moving beyond categorical and typological systems of classification, this paper considers how communities of practice are formed, in part, as a result of common experiences in a shared landscape.

Boric, Dusan (Cardiff University), Marija Edinborough (University College London), Emanuela Cristiani (University of Cambridge), Doug Price (University of Wisconsin, Madison) and Olaf Nehlich (University of British Columbia)

[290] *Social Bioarchaeology of Forager-Farmer Transition in the Balkans*

In Europe, Greece and the Balkans were the first areas to be reached by expanding Neolithic, agricultural lifestyles. The Danube Gorges of the central Balkans represents one of the best case studies in Europe for studying bioarchaeological consequences of the change from foraging to farming thanks to abundant settlement and mortuary record found here. It also provides a good regional anchor point for the contextualization of other contemporaneous sites across the Balkans. A large number of skeletal remains, in the excess of 500 individuals from a dozen sites found along the River Danube in this region provide best insights into how the arrival of new populations along with the adoption of agricultural lifestyles affected human biology. A large suite of now available isotope data, including carbon and nitrogen, sulfur, and strontium, along with data on sex and age profiles, dental calculus, tooth wear and microstructure, paleopathology, and musculoskeletal stress markers allow for fine-tuned reconstructions of human physical

plasticity in the Early Holocene. This paper reviews the current state of knowledge on the bioarchaeological consequences of the transition in the light of the Neolithic Demographic Transition model.

Boric, Dusan [235] see Edinborough, Marija

Boroneanț, Adina [68] see Bonsall, Clive

Borrell, Mònica [23] see Molist, Miquel

Borrero, Luis (CONICET), Fabiana María Martín (CEHA-Instituto de la Patagonia-UMAG), Manuel J. San Román (CEHA-Instituto de la Patagonia-UMAG), Flavia Morello Repetto (CEHA-Instituto de la Patagonia-UMAG) and Dominique Todisco (Université de Rouen)
[226] *Southern Patagonia: Coastal versus Interior Human Migration*

In spite of the ca. 14,000 Cal BP or more at 41° S, the oldest human occupations in southern Chile below 52° S are not easy to explain as a result of a Pacific coastal migration. The oldest Late Pleistocene occupations recorded at Última Esperanza and Tierra del Fuego are all focused on the exploitation of terrestrial resources and have ties with sites located in the eastern steppes, such as Fell Cave, Piedra Museo or Cerro Tres Tetras. The oldest maritime oriented human occupations of the western archipelagos are only of Mid-Holocene age. However, discussion is still open, since this region is still poorly explored.

Borrero, Luis [231] see Morello Repetto, Flavia

Borrevik, Camilla [394] see Ngirmang, Sunny

Bos, Kirsten (MPI, Science of Human History), Åshild J. Vågene (Max Planck Institute for the Science of Human History), Jane E. Buikstra (Arizona State University), Anne C. Stone (Arizona State University) and Johannes Krause (Max Planck Institute for the Science of Human History)

[143] *Tuberculosis in Past Peruvian Populations*

Due to its arid climate the Atacama Desert has an exceptional preservation of ancient biomolecules. In an archaeological context, this allows for genetic analyses of both past human populations and the infectious diseases they experienced. Precontact Peruvian cultures are among the first New World populations to show skeletal indications of tuberculosis, and recent molecular analyses have revealed that three individuals were afflicted with a rare zoonotic form of the disease acquired from marine mammals. This form is no longer circulating in the human population, and it appears to have been replaced by the European variant after contact. While the ancient disease was presumably acquired through either the consumption or manipulation of tissues from affected seals or sea lions, little is known about its range in the human population and whether or not it subsequently became human-adapted. This talk will explore our recent work on the molecular evaluation of additional skeletal material from the Americas that show physical evidence of tuberculosis infections. Our analyses are conducted with the aim of exploring the different forms of tuberculosis that were circulating in the New World before contact, their relationship to the Peruvian form, and the potential evidence for human adaptation.

Bosch, Josep [23] see Molist, Miquel

Bossio, Laura [265] see Chenoweth, John

Boswell, Alicia (Bard Graduate Center and Metropolitan Museum of Art), Ellen Howe (Metropolitan Museum of Art), Joanne Pillsbury (Metropolitan Museum of Art) and Deborah Schorsch (Metropolitan Museum of Art)

[164] *Variations in Moche Metalwork*

In the last thirty years, archaeological investigations on the north coast of Peru have produced a wealth of new information leading to nuances in our understanding of Moche sociopolitical organization (AD 200–800). These discoveries have included excavations of intact tombs of Moche male and female elites, interred with their ritual regalia and other grave goods. Metal ornaments made up an important part of this regalia, yet our understanding of Moche metallurgy technology and its relationship to sociopolitical organization remains under-explored. In this paper we will carry out a systematic comparison of the metal objects and techniques employed to create them from multiple Moche sites. With this comparison we will further document the diverse technologies used throughout the Moche world with the goal of furthering our understanding of Moche metalworking artisans, techniques, and organization. This comparison will document the degree of standardization in Moche metalworking techniques to identify the nature and scale of differences between regions, and how these may shed light on workshop practice and social relations in the Moche world.

Boudreaux, Sarah [83] see Levi, Laura

Boulanger, Clara [180] see O'Connor, Sue

Boutin, Alexis (Sonoma State University)

[31] *Scales of Analysis and Modes of Interpretation in Osteobiography: An Example from the Dilmun Bioarchaeology Project*

Bioarchaeologists have traditionally prioritized statistically significant patterns in large skeletal assemblages to document major biocultural trends in human populations. But in the last 15–20 years, the osteobiography approach has returned to favor, encouraging bioarchaeologists to focus on the specifics of the human scale, reconstruct an experiential prehistory, and restore an identity to those “genderless, faceless blobs” (Tringham 1991:97) who people so many traditional interpretations of the past. My “Bioarchaeology of Personhood” model argues that alternative modes of interpreting osteobiographical data can provide a more humanizing view of past personhoods and can communicate effectively and accessibly with a broad range of academic and public audiences. Unlike the outlier-oriented, case study approach of decades past, osteobiographies should draw from—not substitute

for—the context provided by population-based approaches. To illustrate these points, I will present a fictive osteobiographical narrative about a subject from ancient Bahrain, whose remains are studied by the Dilmun Bioarchaeology Project.

Bouwman, Abigail [219] see Breidenstein, Abigail

Bovy, Kristine (University of Rhode Island)

[228] *Predicting and Assessing the Impact of Environmental Events on Seabirds at Tse-whit-zen Village*

Seabird remains, especially murrelets, scoters, loons, grebes, shearwaters and gulls, are abundant in the Tse-whit-zen faunal assemblage. There is considerable biological research on the effects of climate change on seabirds, especially in light of recent climate trends; for example, responses of seabirds to increased sea surface temperatures associated with El Niño events are well documented. In contrast, there has been relatively little research on the effects of recent earthquakes on marine birds. One might predict that nesting habitat could be altered due to coastal subsidence or tsunamis. However, effects on non-nesting birds, may be considerably more subtle, due to the obvious mobility of marine birds (compared to shellfish or other smaller animals). One possible effect could be a decline or change in the availability of seabird prey such as shellfish or small fish, due to substrate changes or eelgrass destruction. At Tse-whit-zen, herring is one of the major components of the fish assemblage, and many of the seabirds recovered were likely hunted while feeding on herring spawn. I examine the relationship between herring and seabirds at the site through time in response to past earthquakes. Spatial differences in taxonomic composition and taphonomy will also be examined.

Bowen, Corey (Vanderbilt University) and John Janusek (Vanderbilt University)

[230] *Felines and Condors and Serpents, Oh My! Cataloging Zoomorphic Imagery in Tiwanaku Ceramics*

A regimented canon of ceramic production emerged at the site of Tiwanaku in the fifth–sixth century AD, coinciding with the transformation of the site from a local ritual center to a regional political authority. The highly standardized range of forms and painted imagery it produced presents great potential for an extensive analysis of both complete and fragmented Tiwanaku-style vessels. To date, most analyses of Tiwanaku ceramic vessels have categorically centered on form in order to facilitate quantitative comparisons of archaeological contexts. Our recent studies of ceramic vessels from mortuary contexts in the Tiwanaku heartland, under the aegis of an archaeological project directed by Deborah Blom and Kelly Knudson, have sought to develop iconographic classifications to assist out understanding of Tiwanaku's material culture. We seek to create a comprehensive catalog of the zoomorphic representations depicted on Tiwanaku vessels. This assemblage will constitute the foundation for a broader analysis of animal imagery as potent symbolic media on Tiwanaku vessels and other materials, such as stone sculptures.

Bowie, Kristina (University of Victoria) and Jillian Harris (Penelakut First Nation)

[17] *Traditional Practices That Inform Cultural Competency in Archaeological Studies and Cultural Safety for First Nation Communities*

While Canada's Truth and Reconciliation Commission on Indian Residential Schools completed its mandate in December 2015, pursuit of the truths and movements toward reconciliation of past residential school practices continue. Efforts to identify missing former students and locate unmarked cemetery, grave and burial sites are continuing at the former Kuper Island Industrial School on Penelakut Island. This work is structured as both a collaborative and community based archaeology and is being conducted at the request of the Penelakut First Nation to address contemporary concerns. Contemporary archaeological methodologies, including noninvasive ground-penetrating radar survey, are informed by oral histories of residential school survivors, and by traditional skedelich rituals conducted by First Nation community members. As a traditional methodology, skedelich rituals provide cultural safety as a valued method of healing for First Nation community members, a result which is pursued, but for which contemporary Westernized archaeological methods may be inept. In addition to providing an Indigenous framework for analysis and interpretation of this site, cultural traditions and community members must be included in this search journey. This points to cultural competency on part of the archaeologist wanting to help, required before any form of reconciliation of the past can follow.

Bowler, Victoria (University of New Mexico), Emily Lena Jones (University of New Mexico) and Cyler N. Conrad (University of New Mexico)

[127] *The Canids of Arroyo Hondo: A Reanalysis*

Domestic dogs were an important part of human cultures in the prehistoric American Southwest; the significance of these animals is apparent from ceramic decorations and clay figurines, as well as faunal remains. But how these animals functioned within Southwestern cultures is less well-understood. Prehistoric dogs' roles in some cases seem to have been similar to those of modern dogs: protector, worker, and pet. However, zooarchaeological data have shown that dogs, like turkeys, were also used as a food resource and might have sometimes been sacrificed or killed as offerings. The use of stable isotope analysis has the potential to clarify the relationships between humans and dogs in the prehistoric American Southwest. In this paper, we present preliminary data from our reanalysis of the canids from Arroyo Hondo Pueblo, a Pueblo IV community in the Northern Rio Grande.

Bowman, Robert C. [257] see Keeney, Joseph

Bowyer, Vandy [339] see Metcalfe, Jessica

Boyd, Carolyn (Shumla/Texas State University) and Kim Cox (Shumla)

[126] *Burning Water: Time and Creation in the Rock Art of the Lower Pecos*

The White Shaman Mural (~2000 BP) is a planned composition with rules governing the portrayal of symbolic forms and the sequencing of colors. Using digital microscopy we determined that all black paint was applied first, followed by red, then yellow, and last white. Complex images were woven together to form an intricate visual narrative detailing the birth of the sun and beginning of time. One of the key figures in this creation narrative is a small anthropomorphic figure bearing red antlers tipped with black dots. The juxtapositioning of red antlers and black dots is ubiquitous in Pecos River style rock art, as is the painting sequence of these two pictorial elements. In each example, the black dots were applied prior to the red antlers. "Burning Water" explores the significance of this motif in the White Shaman Mural and in the graphic vocabulary of the Lower Pecos. It is a visual pun or couplet metaphor joining two opposing forces—fire and water—to initiate creation and the beginning of human time.

Boyd, Carolyn [126] see Steelman, Karen

Boyd, Charles (Radford University) and Donna Boyd (Radford University)

[259] *The New Role of Archaeology in Forensic Science*

In 2015, the Physical Anthropology section of the American Academy of Forensic Sciences (AAFS) officially became the “Anthropology” section of AAFS. This reflected not simply a name change, but an acknowledgement of the importance of archaeology to forensic anthropology and forensic science. This has heralded a new age of forensic anthropology based on increasing reliance on archaeological methods and theoretical principles. The interaction between forensic archaeology, anthropology, and forensic science is best exemplified in Virginia—since 1999, the authors have worked in conjunction with the Virginia Office of the Chief Medical Examiner, as well as local, regional, and state law enforcement entities, in over 170 forensic investigations. Many of these involved archaeological search and recovery of surface and buried remains. This work has resulted in successful adjudication of many of these cases. The authors have also trained federal and state law enforcement officers in proper forensic archaeological methods. This poster provides an overview of the contribution of archaeology to these cases, as well as an examination of the role of forensic archaeology within the Virginia Medical Examiner system. The opening of AAFS to archaeologists allows the broader application of relevant archaeological methods and principles to modern problems.

Boyd, Matthew**[319] *Prestige Foods and the Adoption of Pottery by Subarctic Foragers***

In the last two millennia before European contact, pottery technology was adopted by foragers across much of the southern Canadian Boreal Forest in response to the spread of Woodland (~100 BC—AD 1700) cultural influence. However, the function and importance of pottery in these northern societies remains unclear due to a combination of poor organic preservation, thin and disturbed stratigraphy, and limited archaeological exploration. In this study, we summarize the results of food residue analyses from 177 archaeological sites distributed across central Canada. We show that pottery was closely linked to the consumption of domesticated plants, especially maize (*Zea mays ssp. mays*), which in most areas of the Subarctic were probably only rarely available through trade or local cultivation. This, combined with other lines of evidence, suggests that pottery was reserved for socially-significant meals such as feasts and imbued with special ritual, culinary, and/or social meanings. We speculate that the spread of pottery technology across the region marks a subtle change in the symbolism, and perhaps importance, of intergroup reciprocity and cooperation during the Woodland period.

[319] Chair**Boyd, Siobhan, Zev Cossin (University of Illinois, Urbana-Champaign), Samuel Connell (Foothill College) and Ana Gonzalez (Foothill College)****[220] *A Dynamic Social Landscape: Recent Investigations at the Hacienda Guachalá, Northern Highlands of Ecuador***

The area of Cayambe in the northern highlands of Ecuador is marked by the physical remains of successive waves of Inca and Spanish imperial expansion and their enduring consequences. Across the landscape high altitude fortifications evidence the drawn-out struggles between expanding Inca and local forces during the fifteenth century. Similarly, elite haciendas that transformed the rural countryside in the interests of imperial and state power continue to dominate the social and political landscape. In this paper, we review recent work carried out by the Proyecto Arqueológico Pambamarca (PAP) in the area of the Hacienda Guachalá, where archaeological investigations have contributed new perspectives on the continuous cultural history of the region. Archival, geophysical, and material evidence have generated both new questions and a greater understanding of the ways in which communities navigated the profound changes that characterize this important region of the northern Andes.

Boyle, Tristan [37] see Webster, Chris

Boytner, Ran (Institute for Field Research)**[70] *Market Economy Solutions to Funding***

Traditional funding structure to support archaeological research consists of grants from public or private organization or donations from individuals, public or private entities. But as these traditional sources are shrinking their allocations for basic research in general, and for the social sciences in particular, archaeologists can harness the power of the market and find market solution to funding of research. This paper will examine one such case—the institution of field schools and the significant way in which they create market incentives to all to generate significant funding, great research and strong commitment to pedagogy.

[70] Chair**Bracken, Justin (CUNY Graduate Center)****[346] *Polyvalent Monumentality: Analyzing Geospatially the Interplay of Fortification and Hydrology at the Maya site of Muralla de León***

Dissertation fieldwork since 2014 at Muralla de León has documented, mapped, and partially excavated an integrated system of earthworks that appears to have served both large-scale defensive and hydrological functions. Located on the shores of Lake Macanché, the site sits atop a steep-sided natural rise, artificially augmented in height by an encircling stone rampart wall, or enceinte. A defensive function for the enceinte is hypothesized, though it also appears to serve as a means of water control within and around the site. Additionally, an artificial channel just outside of the wall likely functioned both for navigation and as a defensive moat. In order to explore the proposed functions for these features, a system of detailed mapping and targeted excavation has been deployed. The mapping effort has utilized a total transit station and handheld GPS unit to produce a high-resolution DEM. This level of detail has allowed for GIS analyses of movement, using tools like least cost path, and of the hydrology of the site interior and adjacent channel. These analyses have informed the major hypotheses of the project, offering useful but not unequivocal insight. Here, the contributions of this spatial component of the project are weighed and discussed.

Bradley, John [28] see Brady, Liam

Bradt Möller, Marcel (University of Erlangen), Gerd Christian Weniger (Neanderthal Museum), Andreas Maier (University of Erlangen-Nürnberg), Isabell Schmidt (University of Cologne) and Maria José Iriarte-Chiapusso (University of the Basque Country)**[165] *The Repeated Replacement Model Reexamined: Methodological Considerations and Dataset Improvements***

Five years ago a general explanation model was introduced regarding the observed dynamics during the Upper Paleolithic timeframe on the Iberian Peninsula. In doing so, a scenario of repeated replacements of human groups was established, reflected by fluctuations within the radiocarbon chronology and changes within the archaeological record. Incorporated into the “Adaptive Cycle Model,” this model assumes a strong relationship between the constant changes of stadial-interstadial environmental conditions and the trend of human resilience to, especially external, stressors. In doing so, the recurring rapid shifts from interstadial to stadial conditions can be understood in the context of a release phases. Only on that account could the soon-succeeding second release impact, the climate deterioration during Heinrich Stadials, have affected the abandoning of the Cycle, i.e., a “breakdown of the meta-population.” Accordingly, the resilience threshold was reached by an environmental “double-punch.” After several years of intensive research in the fields of Upper Paleolithic research we will test the key assumptions of the model a second time, incorporating the enhanced

radiocarbon chronology, new site data and improved paleoenvironmental models. In doing so, we will reexamine the theoretical considerations, as well as the implications derived from the enhanced archaeological and paleoenvironmental datasets.

Brady, Liam (Monash University)

[28] *Embodiment and Relatedness: The Rock Art of Muluwa, Wulibirra, and Kamandarringabaya*

As an interpretive tool for rock art studies, the concept of embodiment has much to offer especially when used in conjunction with ethnographic data. In this paper we focus on embodiment in the context of relatedness using a case study involving Yanyuwa rock art from three sites—Muluwa, Wulibirra, and Kamandarringabaya—in the Sir Edward Pellew islands in northern Australia's southwest Gulf of Carpentaria region. Although not stylistically similar, the rock art from these sites is intimately connected to the travels, events, networks and bodily transformations involving the White-bellied Sea Eagle and Dugong Hunter Ancestral Beings (Dreamings) as well as other spiritual beings known as namurlangjangku. Using ethnographic data collected over a 30+ year period we highlight how these sites and motifs are part of a network of nonhuman entities to which human entities then become involved—the images found here embody the network of relations that Yanyuwa find themselves within. More specifically, we explore the interrelationship between Ancestral and spiritual beings, place, embodiment, kinship, and rock art to better understand how Yanyuwa rock art is perceived and experienced, as well as the role it plays in shaping Yanyuwa identity and relationships with neighboring groups.

[28] *Chair*

Brady, James (Cal State L.A.)

[386] *An Interpretation of Motifs on Protoclassic Polychrome Pottery from Naj Tunich Cave*

A good deal of academic attention has been focused on the iconographic analysis of Maya painted ceramics, principally from the Late Classic Period and to a lesser extent from the Early Classic. The tradition, however, begins in the first century AD during the protoclassic ceramic stage. Virtually no analysis has been undertaken on these earliest Maya artistic expressions probably because the motifs are largely geometric and figural representations are rare. I compiled a motif inventory from Ixcanrio Orange Polychrome sherds recovered from Naj Tunich Cave, Guatemala. Comparisons with ceramics from other sites indicate that the motifs are widely distributed indicating that the symbol set was understood throughout the southern lowlands. The message appears to be a fundamental one in that the same motifs continue to be used all the way through the Classic Period. The message is related directly to earth and water.

[386] *Chair*

Brady, James [386] see Nation, Humberto

Braekmans, Dennis (Delft University of Technology and Cranfield Forensic Institute), Brett Kaufman (University of Science and Technology Beijing), Hans Barnard (UCLA Cotsen Institute of Archaeology) and Ali Drine (Institut National du Patrimoine Tunisie)

[240] *Provenance and Distribution of Neo-Punic Ceramics at Zita, Southern Tunisia, and Beyond*

The site of Zita is an urban mound located in southern Tunisia and situated along an ancient trade route from Carthage to Tripoli. It is the highest point on a peninsula jutting into the Mediterranean Sea across from the Island of Djerba, often identified as the Island of Calypso of the Lotus-Eaters from the Odyssey. Established as a Carthaginian settlement around 500 BCE, the city became a Roman regional center in the first century CE. Zita still has industrial features such as ceramic kilns and metallurgical zones. The ceramics and presence of kiln zones provide the opportunity to characterize the full spectrum of production and/or import and the site. In this study a high resolution geochemical analysis by ICP-OES/MS (n = 145) has been carried out in order to detect the provenance of these ceramics and provide an analytical reference set of data for ceramic production in this part of North Africa. This paper emphasizes provenance of these materials as a key concept to understand the development of trade and technology through time.

Braje, Todd (San Diego State University)

[251] *Trophic Cascades, Kelp Forest Dysfunction, and the Genesis of Commercial Abalone (Haliotis spp.) Fishing in California*

For over 12,000 years, hunter-gatherers of coastal California harvested abalone as an important subsistence and raw material resource. Archaeological evidence from the Northern Channel Islands suggests that human-induced reductions of local sea otter populations may have triggered a trophic cascade beginning 8,000 years ago and released abalone and other shellfish from predation pressure, helping to sustain intensive human harvest for millennia. With the arrival of the Spanish in AD 1542 and the Mission Period in AD 1769, abalone were quickly released from nearly all predation as sea otters were locally extirpated and indigenous shellfisheries were severely disrupted. For decades, abalone populations exploded, reaching unprecedented sizes and densities. By the 1850s, however, Chinese immigrants recognized the potential of abalone and founded the first commercial shellfishery in California. Although the fishery was predicated on ecosystem dysfunction, Chinese fishers harvested black abalone relatively sustainably for decades. Ironically, it was state and federal claims of overharvest that resulted in targeted legislation of Asian fishers and the subsequent collapse of the commercial fishery by Euro-American interests. Today, California abalone communities are a shadow of their former selves, but restoration targets based on historical hyper-abundance and lacking perspectives from deep history may only compound the problem.

Braje, Todd [32] see Erlandson, Jon

Brandi, Rafael [45] see Colonese, Andre Carlo

Brandt, Bernd W. [69] see Ziesemer, Kirsten

Brandt, Johann Rasmus [151] see Wong, Megan

Brandt, Steven (University of Florida), Lucas Martindale Johnson (University of Florida) and Abebe Taffere (University of Florida)

[171] *Temporal and Spatial Variability in Pre-Aksumite Lithics from Mezber, NE Ethiopia: Social and Economic Implications*

With over 33,000 total excavated flaked stone artifacts and >18,000 analyzed from deposits in primary context, Mezber offers a unique opportunity to understand the role of lithics in Pre-Aksumite societies. Using multiple raw materials and reduction sequences, knappers produced a wide array of LSA/Neolithic tools for domestic use, and a narrower range for specialized activities. Locally available chert was the most common raw material, although pXRF results indicate ≥3 as yet unknown distant sources for obsidian, the second most frequent toolstone. Significant temporal and spatial variability in lithic type and frequency over ~1,400 years of continuous Pre-Aksumite occupation at Mezber, suggests important changes in community

practices that incorporated lithics. Sparse during the Initial Phase, lithics become more frequent and typologically diverse in the Early Phase, reflecting their importance in domestic activities. Lithics experience a dramatic increase in frequency during the Middle Phase. Some fields are dominated overwhelmingly by only one artifact type (scrapers), suggesting more intensive craft specialization. Lithic frequencies decline markedly during the Late Phase, and especially at those locations with previous high scraper frequencies. We conclude by discussing the economic and social roles that lithics played in early state formation in the northern Horn of Africa.

Braswell, Geoffrey (UC San Diego)

[182] *Discussant*

Braswell, Geoffrey [218] see Robinson, Eugenia

Braun, David R. (George Washington University), Jonathan S. Reeves (George Washington University) and Matthew Douglass (University of Nebraska-Lincoln)

[38] *Density, Discard, and Distraction: How Do We Form Inferences of Behavior from the Early Pleistocene Record*

The discovery and excavation of dense patches of lithic artifacts has spurred discussion about how such features form. Interpretations are often based around the assumption that these reflect locations of targeted hominin use. Despite their assumed significance, there remains the possibility that high density scatters may reflect the vagaries of the formation processes of the Early Pleistocene archaeological record. Here we use a neutral model of the formation of the archaeological record to investigate the significance of archaeological densities at local and global scales. Even when the underlying processes driving the discard of lithic material are random, there is the possibility that high artifact densities can form. Moreover, when investigated at a local scale, distributions of artifact frequencies can appear nonrandom. These results suggest that while hominin behavior was not stochastic, the overprinting of behavior due to time-averaging may cause it to appear so. As such we suggest that Early Stone Age archaeologists should investigate formational processes at multiple scales when using artifact density to develop behavioral inferences.

Braun, David R. [153] see Beaudoin, Ella

Braun, Greg [22] see Roddick, Andrew

Braun, Gregory (University of Toronto, Department of Anthropology)

[178] *Ceramic Technologies and Technologies of Remembrance: An Iroquoian Case Study*

The patterned deposition of certain objects, often in association with materials or structures that are seen to have symbolic associations, is an act of memorialization seen in many Neolithic and broadly shamanic societies throughout the world. This paper uses petrographic and contextual data to explore how objects manufactured with certain material qualities may have served as symbolic referents to memories related to Ontario Iroquoian ritual and social practices, both at the object level, and in the built environment of the Iroquoian longhouse. Through these associations, Iroquoian encounters with "bundled" material qualities precipitated remembrance. The participatory experience of creating (and by extension, re-encountering) structured deposits containing such objects resulted in the creation, modification, or destruction of other social relationships. For its occupants, the spaces inside an Iroquoian longhouse were filled with unseen subterranean deposits, containing materials and memories that reflected and reified Iroquoian cosmologies, and influenced quotidian social practices.

Bray, Tamara (Wayne State University)

[331] *A View from the Hinterlands: Early Colonial Objects in Mortuary Contexts in Northern Highland Ecuador*

In this paper I revisit a particularly interesting find made in the Pimampiro District of northern highland Ecuador a number of years ago. It consisted of a traditional shaft tomb burial that contained an unusual assemblage of items, which included seemingly obvious Late Period Caranqui and Panzaleo wares together with a set of four Nueva Cadiz beads. How and why did these precious European objects penetrate this seemingly remote region at such an early date to be inserted into such a basic ritual context? What does their presence within an otherwise completely "precolumbian looking" context indicate with respect to temporality, materiality, and archaeological assumptions? In this paper, I analyze this mortuary assemblage with respect to regional, historical, and social context, as well as in light of networks of meaning, the notion of value and material agency.

[65] *Moderator*

Breidenstein, Abigail (Department of Anthropology, University of Michigan), Geoff Emberling (Kelsey Museum of Archaeology, University of Michigan), Abigail Bouwman (Institute of Evolutionary Medicine, University of), Frank Ruehli (Institute of Evolutionary Medicine, University of) and Abigail Bigham (Department of Anthropology, University of Michigan)

[219] *Christian Life in Medieval Nubia at el-Kurru, Sudan*

The Nubian site of el-Kurru (modern Sudan) lies along the Nile River about 140 km upstream of Old Dongola, the capital of the Medieval Christian kingdom of Makuria. In 2015–2016, a cemetery adjacent to the settlement was excavated, containing 26 skeletons. Here, I will present current bioarchaeological work on these individuals. Biological profiles were developed, including sex and age ranges, health markers evaluated, and indicators of pathology and trauma identified. Those interred span all ages, from infants to older adults, with an equal distribution of sexes. No indications of interpersonal violence are present. Age-related pathologies (i.e., osteoarthritis, advanced dental wear) are evident in a quarter of the sample population, while signs of probable disease (i.e., periostitis, cribra orbitalia) are present in another quarter. Archaeological evaluation of the burials, directional organization, and scarce grave goods indicates these individuals were Christians. Further analyses include extraction and sequencing of ancient DNA, stable isotope analysis, AMS Radiocarbon dating, and additional development of biological profiles to include stature and ancestry markers. Compared to a wealth of physical anthropological work on Medieval Lower Nubia, this sample population provides a means to understand life in the relatively less-studied kingdom of Makuria using archaeological and bioarchaeological data.

Breitenbach, Sebastian [162] see Baldini, James

Bremer, J. Michael [394] see Higgins, Howard

Brenan, Julia**[318]** *Birch Island: The Archaeology and Memory of Resettlement*

Archaeology has the ability to bring people together and assist communities in creating their own historical narrative so it can be passed on and acknowledged, corrected and recorded, within and outside of their community. My work in Happy Valley-Goose Bay, Labrador on an archaeological site that only ended occupation in the late 1960s facilitates the formalization of the historical narrative of the former Birch Island community through archaeology, historical research and personal interviews. Community members who once lived on the island will be invited to excavate with us in addition to participating in formal and informal interviews to get a better picture of what life was like when the community flourished. All the information gathered will be available for public use and historical plaques will be placed at the site to inform and commemorate the area. By actively seeking out these open lines of communication and engagement, we are decreasing our own bias and allowing for a more engaging, meaningful and accurate interpretation of places that have a living history for those connected to it.

Brendzel, Tamar [159] see Kennedy, Ryan

Brendzy, Cara [17] see Smith, Sarah

Brennan, Michael [83] see King, Eleanor

Brennan, Candice**[300]** *Prehistoric Settlement Patterns of the Los Alamitos Bay, Southern California*

The details of prehistoric settlement patterns in the Alamitos Bay area of southern California are not well documented. Due to rapid urban development throughout the twentieth century, the archaeological record has been explored with only limited excavations. The lack of systematic investigations has limited our knowledge about prehistoric populations and their variability in terms of subsistence practices and settlement patterns. Using a review of information gleaned from archaeological studies conducted over the last 60 years, I generate a model of settlement pattern that summarizes our current understanding of how communities were temporally and spatially distributed across environment of Alamitos Bay as a function of the available subsistence resources and how these communities responded over time.

Breslawski, Ryan (Southern Methodist University)**[85]** *Seasonal Bison Exploitation in North American Prehistory: A Probabilistic Approach Using Fetal Prey Osteometry*

Bison remains often serve as evidence for seasonal food exploitation in archaeological investigations of the Great Plains and adjacent regions. Interpreting this evidence relies on discrete rutting and calving periods that allow zooarchaeologists to link ontogenetic data to a specific time of year. However, ecological data on modern bison show that the timing of rutting and calving behavior varies between herds and even within the same herd between years. To address this problem, this study models variability in conception dates across modern bison herds. In combination with metric data from fetal prey remains, these conception models are then used to create intra-annual probability distributions for the timing of a hunting event. Using intra-annual probability distributions obtained through this approach, this paper assesses seasonal subsistence hypotheses at three Late Holocene sites: Big Goose Creek (Wyoming), Baker Cave III (Idaho), and Upper Tucker (Texas). Unlike efforts to infer seasonality from fetal bison remains with other methods, this study provides easily interpretable probabilities showing the level of agreement between data and hypotheses.

Breukel, Thomas (Leiden University)**[69]** *Jade Axes from the Site of Pearls, Grenada: A Field-Based Microwear Analysis*

This paper reports upon the wear trace analysis of 20 ground stone axes from the Ceramic Age site of Pearls, Grenada. The selection contains several exotic lithic materials including twelve jadeitites, for which the nearest known source is over 1,100 km away. Pearls is a heavily disturbed site on the Atlantic coast of Grenada, of which much of the material record is held in private custody. Yet, the site holds central importance in the wider interacting region, as a lithic, ceramic, and ornament production center with suggested exchange ties to many source areas and partner sites. A biographical study was undertaken in order to obtain information about the context in which the jadeitite materials arrived at the site, where and how they were manufactured, and if they had been put to use. Collections from the Windward Islands have thus far not been analyzed using microwear analysis, making this study a first. Further, the analysis was enabled by transporting a DinoLite digital microscope and a Nikon Optiphot metallographic microscope to the field. The methodological complications with a study of archaeological records accessible solely through non-institutional sources will be evaluated.

Brewer, Jeffrey [337] see Haggard, Alyssa

Brewer, Katherine (University of New Mexico)**[192]** *Religion and Death: Missionization and Its Effects on Puebloan Burial Practices during Spanish Colonization*

For the Spanish, conversion to Catholicism was an important part of the colonial strategy in the New World in order to have more perceived control over the indigenous groups they encountered there. In New Mexico, conversion of the Puebloan peoples became the main reason for remaining in the territory after little to no material wealth was found. Much of this conversion was forced, and the question remains as to exactly how many Pueblos converted and how many converted in public while practicing their native religion in private. By analyzing burial patterns pre- and postcontact, it is possible to see changes in burial ritual related to the conversion process. Catholic burial ritual involves a specific set of steps, from the last rites to the interment, while the Pueblos had their own burial rituals that differed from Catholicism in many ways. Both of these can be compared to Puebloan mission burials to see what, if any, changes occurred due to missionization.

Bria, Rebecca E. (Vanderbilt University)**[37]** *Rethinking Assemblages in the Digital Age*

Archaeologists have long drawn on technological advances from other disciplines to create new ways of visualizing and classifying data. Relational databases in particular have been a cornerstone of archaeological inquiry into material assemblages, whether sets of artifacts and their attributes or constellations of sites across regions. But how have new technologies (e.g., spatial, three-dimensional, mobile, and digitally collaborative platforms) enhanced archaeologists' ability to trace, and ultimately understand, complex networks of social and physical relationships between humans, things, and spaces? How can new materialist theories, with their sharp focus on the matrices or assemblages of materials that constitute any archaeological object or subject, lead us to rethink how we develop and apply digital technologies in archaeology? This paper offers insights from multiple years of

digital archaeological research in the highland Andes to combine recent developments in digital and theoretical archaeology. It argues that the relational structure and ontology of many digital data applications can enhance archaeological understanding of human-material dependencies. It contends that digital archaeology, with its unique ability to trace human-material relationships across time and space, can greatly contribute to contemporary debates regarding the social and physical environment.

[37] Chair

Bria, Rebecca E. [222] see Sharp, Emily

Briceno, Jesus [222] see Bardolph, Dana

Brickley, Megan

[22] *New Perspectives on Past Vitamin D Deficiency*

Less than half of the current world population is estimated to have adequate vitamin D status and potential consequences are much debated. For those engaged in addressing the challenges that vitamin D deficiency poses, information on past deficiency provides an important time dimension to current debates. Over the last 15 years I have undertaken extensive collaborative work on past deficiency. Investigations at St. Martin's, a nineteenth-century UK site, established diagnostic criteria and revealed the sociocultural complexity of deficiency. Work undertaken at McMaster has demonstrated that contrary to popular belief the condition is not just associated with Northern European cities in the Industrial Revolution. In the largest-scale project undertaken to date (3,426 individuals) vitamin D deficiency has been shown to be widespread across the Roman Empire (third–sixth c.CE). Although latitude plays a role, level of urbanization and social complexity are clearly also factors. New work on defects in dentine linked to vitamin D deficiency offers the opportunity to determine the number and severity of episodes of deficiency. Dentine defects are preserved indefinitely and in combination with skeletal features can illuminate the individual experience of deficiency in the past and contribute to current debates on health.

Brien, Marie-Claude [178] see Loewen, Brad

Briggs, Rachel (University of Alabama)

[142] *A Gendered Approach to Assessing Differences in the Hominy Foodway in Central Alabama*

Between AD 1000–1120, groups living in the Black Warrior Valley of west-central Alabama adopted maize agriculture and began practicing an ancestral hominy foodway that not only included nixtamalizing culinary steps, but also included the use and production of a new ceramic technology, the Mississippian standard jar, as well as a new cooking technique, hot coal cooking. Curiously, while groups to the east of the valley also adopted maize and began cooking hominy, they forewent other material and practice-based signatures characteristic of the foodway in the Black Warrior Valley. While this rejection has traditionally been interpreted as a broader, active refutation of a Mississippian lifeway, this paper draws on settlement, subsistence, and ceramic data to assess whether differences in gender roles and seasonality may instead be more useful for understanding the development of these two coterminous hominy traditions.

Briggs, Garrett (Northern Arizona University)

[266] *Analyzing Wood-Use Behavior at Wupatki Pueblo*

Wupatki Pueblo is one of the best known prehispanic settlements in northern Arizona. Unfortunately, very few excavation reports exist and only a couple of successful dendochronological analyses have been published. Through a reexamination of wooden construction elements, legacy data from previous publications, and unpublished field notes, stored at the Laboratory of Tree-ring Research, this paper presents the results of the first wood-use behavior analysis at Wupatki Pueblo. The use of a holistic methodology (i.e., the use of statistical analyses and Exploratory Data Analyses) revealed that tree type allocation and consumption, particularly the utilization of both high and low elevation conifers, maintained throughout the construction sequence at the pueblo. Through the combination of modern and post-modern indigenous theories and analogical models (predicated upon wood-use behaviors displayed among one of the primary descendent communities), wood-use behavior at Wupatki Pueblo is interpreted as an example of learned behavior through enculturation, guided by a shared cultural system of meaning based in ritual. The emphasis of this paper is not only on the results of this analysis, but also on the importance of considering both the culturally defined and scientifically explained contexts when interpreting wood-use behavior.

Bright, Lisa and Joseph Hefner (Michigan State University)

[300] *A Different Kind of Poor: A Multi-Method Demographic Analysis of the Santa Clara Valley Medical Center Historic Cemetery*

From 2012–2014 excavations at the Santa Clara Valley Medical Center (SCVMC) Historic cemetery (circa 1875–1935) resulted in the exhumation of 1,004 individuals. The cemetery, which served as one of several county burial grounds for the indigent and unknown individuals of the area, provides a glimpse into the growth and development of Santa Clara County, California. To date no cemetery records have been located, leaving the identity of these individuals a mystery. To better understand this population, a demographic analysis employing various Siler and Gompertz mortality models, as well as correspondence and transition analysis was used to compare the osteological age-at-death assessments at SCVMC to other historic bioarchaeological samples (Milwaukee County Institution Ground, Alameda Stone, and Voegtly). Additionally SCVMC is compared to known age-at-death data from Mission City Memorial Park, a contemporaneous historic county burial ground in Santa Clara County, whose data was scraped from a local genealogy website. The results indicate that individuals interred at SCVMC were likely recent immigrants into the area, and experienced higher mortality risk than the comparative sample. Interestingly males and females at SCVMC experienced identical mortality risks, contrary to the comparative sample. Demographic analysis allowed for a better understanding of county burial practices.

[372] Discussant

Brighton, Stephen (University of Maryland)

[207] *Working on the Margins of the Modern World and Within Archaeology: The Historical Archaeology of Late Nineteenth- and Early Twentieth-Century Ireland*

In Ireland, historical, post-medieval, or modern world archaeology as a discipline is located on the margins. The time period and material comprising our research is argued by many to be relevant only to the pursuits of historians and folk studies. In this paper I discuss the importance and relevance of a discipline on the margins and the study of Ireland's impoverished class during the last decades of the nineteenth and early twentieth centuries. This marks one of the most dynamic periods in Ireland's political, economic, and cultural history which includes the complexities of identity during struggle and conflict. The material culture from two archaeological sites associated with The Archaeology of Ireland's Early Modern History research program in Skibbereen, County Cork, structures this paper. The sites date from the early 1840s to the late 1920s and serve to illuminate the importance of historical archaeology to modern heritage formation, as well as the intricacies of this transformative period of Irish socioeconomic and cultural history.

[207] Chair

Brin, Adam
[149] *Discussant*

Brin, Adam [227] see Kintigh, Keith
Briseno, Monica (CSULA Student)

[156] *Archaeology of Religion in Nicaragua*

This past summer I was given the opportunity to participate in an archaeology field school conducted in the country of Nicaragua. For the past 15 years, archaeologists have excavated sites along the shore of Lake Cocibolca in search for Mexican colonization. During my participation in the field school, we continued this quest through investigations at the site of El Rayo, the most significant site for studying the potential impact of outsiders on indigenous cultural traditions. The core theoretical perspective focused on the interpretation of culture change, especially ethnicity, in the centuries leading up to the Spanish Conquest in 1522 CE. As such, the results are of fundamental importance to developing claims of cultural identity by existing indigenous groups in the region. Ethnohistorical accounts from the sixteenth century CE describe the indigenous cultures of Pacific Nicaragua, including strong evidence for shared Mesoamerican cultural and linguistic traits. Using the ethnographic information, ceramic analysis, and research I collected during my time in Nicaragua I will attempt to interpret the religious aspects of precolumbian indigenous cultures, bolstered by a cultural comparison of precolumbian indigenous cultures of Nicaragua to that of Mesoamerica.

Brite, Elizabeth Baker (Purdue University)

[285] *Irrigation Canals as Subaltern Agents of Resistance: An Example from Nineteenth-Century Russian Turkestan*

In the mid-nineteenth century, Imperial Russia established domination over "Russian Turkestan," a large territory in Central Asia. A core part of the colonial mission was the transformation of Turkestan's arid environments into productive farmland. Though this was eventually achieved by the Soviets who constructed massive new irrigation systems in Central Asia, earlier imperial authorities failed in this task and struggled for decades to wrest control of water management from local populations. In this paper, I examine this brief but significant initial period of conquest when the canals and the people of Turkestan resisted the imperial domination of the Russian Empire. Taking a turn toward new materialist perspectives, I explore how the precolonial canals themselves were important, subaltern agents of resistance that provided a basis around which humans could act to subvert authority. I consider the ways that these acts were imprinted on the material record of Central Asian landscapes, and explore how irrigation canals may be legible artifacts of resistance to imperial expansion.

Brite, Elizabeth Baker [25] see Negus Cleary, Michelle

Britt, Kelly (FEMA)

[141] *Collaborating on the Federal Level: Moving beyond Mandated Consultation in the Section 106 Process*

Collaboration versus Consultation—while both terms involve working with stakeholders, consultation implies a formulaic, reactionary response or product and can produce negative connotations while collaboration suggests a voluntary, shared method and a mutual goal, invoking more positive connotations. Within archaeology, collaboration is not a new practice. Yet within this postcolonial approach to conducting archaeology there is little discussion around what this looks like within the public sector. The National Historic Preservation Act and the National Environmental Policy Act mandates a consultation procedure with a variety of stakeholders—from state and local agencies to tribal nations and community interest groups. Since consultation as mandate is based in a colonial process and has definitive legal and bureaucratic boundaries, the question arises: can we as archaeologists working in the public sector take a postcolonial approach to required consultation? If so, how? What institutional changes are needed to enable a collaborative practice rather than merely a consultation product? And with that, how does this processual change affect methodology and theory throughout the discipline and beyond? This paper looks at areas of constraint and potential spaces for moving beyond the mandate of consultation within a federal agency, specifically the Federal Emergency Management Agency (FEMA).

Britt, Krystal (University of Illinois at Chicago)

[390] *Ceramic Production and Community Formation in the Middle Little Colorado River Valley, Northern Arizona*

As is true today, migration throughout the past had a phenomenal impact on communities through the renegotiation of cultural practices, community and social identity. Using LA-ICP-MS I investigate community formation through shared ceramic production practices in Northern Arizona during the Pueblo III period (1125–1275 CE). This paper introduces the preliminary results of ceramic compositional analysis from contemporaneous sites in the middle Little Colorado River valley. During short-term environmental fluctuations throughout prehistory the reliability of the Little Colorado River would have served as an important draw to the region. The overall environment of the middle Little Colorado River valley, as well as variability in climatic conditions throughout prehistory has contributed to widespread movement into and out of the region over time. During the Pueblo III period in particular this region experienced an influx of migrants from a variety of cultural and geographic backgrounds, providing a unique opportunity to examine how groups negotiated the social environment during periods of widespread population movement and social reorganization.

Britton, Kate (University of Aberdeen and Max Planck Institute for Evolutionary Anthropology), Edouard Masson-Maclean (University of Aberdeen), Ellen McManus-Fry (University of Aberdeen and Thames Valley Archaeology), Claire Houmard (Université Paris-Ouest Nanterre La Défense) and Carly Ameen (University of Liverpool)

[127] *The Archaeology of Dogs at the Precontact Yup'ik site of Nunalleq, Western Alaska*

Historically and ethnographically dogs have played a prominent role in the lifeways and lifeworlds of many Arctic and sub-Arctic peoples, and are considered to be a vital aspect of adaptation to living in these regions, providing protection, fur and meat, as well as aiding hunting and transportation. Excavations at the precontact site of Nunalleq in the Yukon-Kuskokwim Delta in coastal Western Alaska have uncovered a significant proportion of dog bones among the faunal assemblage. The presence of discontinuous permafrost at the site has resulted in the excellent preservation, not only of bone, but also of dog fur and even dog lice in deposits at the site, along with vast organic and inorganic material culture assemblages. Here we present a multi-stranded, cross-disciplinary study of the archaeology of dogs at Nunalleq. By incorporating the bioarchaeological analysis of dog remains (osteology, morphology, aDNA, isotopes) with the study of material culture, soils and other bodies of evidence, and the ethno-historic record, we go 'beyond domestication,' providing insight into this vital component of precontact animal-human relationships in Western Alaska and the varied roles, and significance, of Arctic North America's only precontact domesticate.

Britton, Kate [144] see Hillerdal, Charlotta

Britton, Emma, George Gehrels (University of Arizona) and Mark Pecha (University of Arizona)**[237]** *Results of a New Method for Characterizing Casas Grandes Polychromes*

Through time, the analyses of archaeological ceramics have produced a diverse number of characterization techniques. These various techniques have allowed us to create multiple understandings of style, production, and exchange patterns, building a formidable tool kit that is able to speak to many aspects of human behavior. However, though our standard set of techniques is imposing and productive, they may not automatically produce datasets that naturally lead to concrete patterns and natural interpretations. For example, typically-used techniques that have successfully characterized polychromes in the American Southwest, NAA and petrography, have not lead my dissertation work with Chihuahuan polychromes to clear or concrete understandings of the production and exchange of these vessels in the Casas Grandes region. This is not to say that either technique has been not-useful in exploring potential patterns. Rather, a combination of cultural choice and natural environment has colluded in making these standard methods less-appropriate techniques for this area. In response to these conditions, I will discuss the results of a pilot study of 18 Ramos and Babicora polychromes, from across the region, using a relatively new mode of analysis, capitalizing on zircons, that could address regional issues in characterizing the ceramics of Northwest Mexico.

Brodie, Natalie [300] see Downs, Lauren

Brody, Rachel [282] see Connell, Samuel

Brokaw, Nicholas [83] see Hart, Thomas

Bronk Ramsey, Christopher (University of Oxford)**[330]** *Resolving Patterns in Radiocarbon Data*

Radiocarbon is one of the most widely used chronological tools in archaeology but resolving patterns in large datasets is still difficult to achieve. This is partly due to the calibration process that itself generates patterns reflecting the changes in the radiocarbon levels within the environment. In addition, in many cases, the difficulty in obtaining sufficient numbers of measurements to draw definitive conclusions can be an issue and there is always the danger of over-interpretation. Bayesian analysis has been very powerfully used to resolve chronology in deeply stratified single sites but cannot be used in many types of archaeological research. Kernel density methods have the potential to explore less structured distributions of dates to reveal both temporal and geographical patterns. Critically they can also help to evaluate whether the datasets are large enough to answer specific questions. This paper will draw on a number of case studies with a particular focus on data on hunter-gatherers in the Baikal region.

[254] *Discussant***Broodbank, Cyprian (University of Cambridge)****[180]** *Is Mediterranean Island Colonization Still Interesting?*

Island colonization took off as a field of comparative archaeological investigation during the 1970s and 1980s, with thought-provoking analyses of regional theatres (primarily Oceanic, Caribbean and Pacific), as well as pioneering efforts to explore wider commonalities and differences between these. In the Mediterranean, the research of John Cherry sought underlying patterns and processes among a mass of empirical data, within which new evidence might find meaning and place. Such evidence has indeed accumulated, much of it affirming existing patterns but some potentially questioning earlier interpretative frameworks. This paper considers to what degree island colonization analysis remains a challenging, innovative framework for Mediterranean archaeology today, versus the degree to which it is now essentially an intellectually mined-out field of study awaiting only the last infillings of data. The focus is on the questionable discreteness of insular colonization from wider processes in this fragmented environment, the disputed significance of putative Paleolithic activity, early-mid Holocene insights from Cyprus and the Balearics, and the relatively more dynamic results to be obtained from post-colonization studies. Some implications of these considerations for global island archaeology will be proposed.

[133] *Discussant*

Brook, George A. [62] see Franco, Nora V.

Brooks, Allyson**[206]** *Discussant*

Brooks, Paula [343] see Marquardt, William

Brown, David (University of Texas at Austin)**[220]** *Cochasquí in Context: The Evolution of a Monumental Center*

Recent investigations suggest that the history of the northern Ecuadorian mound group at Cochasquí was complex and that the perception of the site as a single, mostly unchanging monumental center is simplistic at best. Begun by AD 1000, the earliest constructions within the complex were modest rounded mounds, several containing burials. By AD 1250, much larger, ramped square mounds signaled a major shift in site function possibly associated with the eruption of Quilotoa volcano, 125 km to the southwest. Expanded soon after the devastating eruption and occupied during a subsequent widespread drought, the new, larger pyramids were topped by round temple buildings that might have included water-related rituals. Decades of excavations have failed to find evidence of a significant population near the site and Cochasquí may have been an extra-regional pilgrimage center, at least after AD 1250. The Inka, who arrived sometime around 1500, did not destroy the site as once thought, but refurbished several pyramids within the fully functioning center, as they did at Pachacamac and Tucumé on the coast of Perú. Modern myths surrounding Cochasquí have obscured the Inka presence and little is known of the site's role in the Inka conquest and ultimate domination of northern Ecuador.

Brown, Dorcas (Hartwick College) and David Anthony (Hartwick College)**[221]** *Bronze Age Economy and Rituals at Krasnosamarskoe in the Russian Steppes*

The final report of the Samara Valley Project (SVP), a U.S.-Russian archaeological investigation conducted between 1995 and 2002 in the Samara Oblast in central Russia, was published in June 2016. The SVP explored the changing organization and subsistence resources of pastoral steppe economies from the Eneolithic (4500 BC) through the Late Bronze Age (1900–1200 BC) across the steppe and river valley landscape in the middle

Volga region. Particular attention focuses on the role of agriculture during the unusual episode of sedentary, settled pastoralism that spread across the Eurasian steppes with the Srubnaya and Andronovo cultures (1900–1200 BC). Three astonishing discoveries were made by the SVP archaeologists: agriculture played no role in the LBA diet across the region, a surprise given the settled residential pattern; a unique winter ritual was practiced at Krashnosamarskoe involving dog and wolf sacrifices, probably related to male initiation ceremonies; and overlapping spheres of obligation, cooperation, and affiliation operated at different scales to integrate groups defined by politics, economics, and ritual behaviors.

Brown, James (Washington State University), James Chatters (DirectAMS), Patrick McCutcheon (Central Washington University), James Feathers (University of Washington) and Steven Hackenberger (Central Washington University)

[86] *Radiocarbon Dating Versus Luminescence Dating in the Pacific Northwest*

In the Pacific Northwest of North America, the radiocarbon dating of charcoal has become the standard for assigning age to archaeological contexts. Other dating techniques are seldom used. Underused techniques like luminescence dating can apply when organic materials for radiocarbon dating are absent, unreliable or not associated with events of interest. In the Pacific Northwest, luminescence dating is beginning to be used for dating features containing fire-modified rock. By dating the last exposure to sufficient heat, luminescence has potential of high accuracy, even if precision is less than radiocarbon. Here we compare paired radiocarbon dates on charcoal and luminescence dates on fire-modified rock from seven feature contexts in three archaeological sites. A strong association between these radiocarbon and luminescence dates could justify an increased use of luminescence dating. All samples were recovered from hearth or oven features. The results of this analysis indicate a close relationship of the match-pairs within 2-sigma date ranges, indicating luminescence is a viable alternative for chronometric dating in the Pacific Northwest. The ability to date fire-modified rock features is especially important for tracing the age and distribution of rock ovens along with the intensification of plant use between 5,000 and 2,000 years ago.

Brown, Kaitlin (University of California, Santa Barbara)

[142] *Colonialism and Cuisine: Change and Continuity in Soapstone Consumption during the Contact Period in Alta, California*

This paper investigates the processes of colonialism and identity politics in the Santa Barbara Channel region through the lens of consumption. The establishment of colonial institutions became entangled with preexisting indigenous industries, thus creating change and continuity in a variety of practices. Here, I focus on soapstone vessels as they were utilized for cooking and storing foods before, during, and after the mission period. A drastic shift in the morphological characteristics of these cooking pots inside the mission space indicates a shift in food processing activities and gendered specific tasks beginning in AD 1782. I argue that this change reflects the rise of a new citizen class, one in which Christianized Indians began producing and consuming goods that were influenced by Spanish/Early Hispanic practices. I also find that the use of traditional soapstone vessels indicates the persistence of deep-rooted practices that were maintained in the historic period. By situating soapstone consumption at the center of this study, a reassessment of foodways, identity, and gender is offered in the region during the colonial period.

Brown, Kyle [40] see Schoville, Benjamin

Brown, Linda (George Washington University)

[80] *Tz'utujil Maya Ritual Practitioners, Embodied Objects, and the Night*

For contemporary Tz'utujil Maya ritual practitioners living in the highlands of Guatemala, the night is a particularly potent time and one to which they are inherently linked. Individuals often learn of their destiny to become ritual practitioners when they are first contacted by ancestral beings, known collectively as nawales, at night during dreams. Thereafter ancestral nawales and ritual practitioners enter into mutually beneficial social relationships that are mediated through sacred objects associated with the night. These objects—precolumbian figurine fragments, obsidian cores, greenstone celts, etc.—may look ordinary but they are far from it. Instead, they hold a unique ontological status as animate objects embodied by beings from a previous era, a dark world that existed prior to the creation of our present sun. Ritual practitioners understand that although sacred materials appear to be mundane inanimate objects by day, during this time they are resting. Reflecting their predawn origins, they become active at night when they go forth to wander the earth and conduct their sacred work. In this talk, I examine the night through the lens of contemporary Tz'utujil ritual practitioners who enter into reciprocal relationships with these embodied nawal-objects.

Brown, M. Kathryn (University of Texas at San Antonio) and Carolyn Freiwald (University of Mississippi)

[5] *Pot Luck: Building Community and Feasting among the Middle Preclassic Maya*

Ritual feasting as a practice by which sponsors create uneven social relations with other participants has been suggested to play an important role in establishing social hierarchies in many ancient societies including the ancient Maya. Feasting activities may have also been an important part of Preclassic communal building projects in the Maya lowlands. In this paper, we present data from Middle Preclassic special deposits associated with a series of early public platforms at the site of Blackman Eddy, Belize. Ceramic, faunal and botanical analyses support the interpretation that feasting activities occurred at these locations and appear to have been highly ritualized.

Brown, Mary

[175] *Rock Art as Ritual Communicator: A Theoretical Evaluation*

Archaeologists typically dissect rock art stylistically, symbolically, and chronologically. Symbols, in particular, lead to studies of representational imagery, entoptic phenomena, or religious icons. What remains underexplored is the concept of animism and its related behavioral activities. This paper applies a behavioral theory of communication to study the interactions between people and things. It uses performance characteristics analysis to determine the activities associated with attributes of rock art's natural and cultural context, manufacture traces, use wear, and maintenance. The analysis is illustrated through a case study of rock art surrounding the fourteenth century Cottonwood Springs Pueblo (LA 175), in the Jornada Mogollon of southwest New Mexico. This pilot study evaluates the potential for using a communication model to interpret rock art and similar media, such as ceramic design elements, textile imagery, and wall murals.

Brown, Thomas (University of British Columbia), Kevan Edinborough (University College London), Andrew Martindale (University of British Columbia) and Kenneth M. Ames (Portland State University)

[176] *A Radiocarbon Test for Significant Demographic Events in Written and Oral History*

We present the results of a simulation based test for the existence and significance of two known demographic event horizons. We extend the Shennan et al. (2013) summed probability distribution frequency method to provide a value of statistical significance for the period between two defined calendar dates. Case study one extrapolates population data from the Western historical record relating to the catastrophic European Black Death and finds a consistent statistically significant drop in population. Case study two uses a regionally scaled database of radiocarbon dates to test for a gap in settlement recorded in the oral historical traditions of descendant Tsimshian First Nation communities from the modern Prince Rupert Harbour region of Pacific Northwest British Columbia, Canada. Strong support for this "gap hypothesis" is found.

Brown, William (Department of Anthropology, University of Washington)

[387] *Disentangling the Demographic Consequences of Subsistence Stress and Parasite Epidemiology among the Ancestral Alutii of the Kodiak Archipelago*

Ecological and biodemographic perspectives on human population history emphasize changes in health and disease as key drivers of macrodemographic change. However, the approaches that demographers and archaeologists have taken to modeling the epidemiologic and demographic sequelae of food insecurity on one hand and infectious disease on the other differ in several noteworthy respects: Models addressing subsistence sufficiency and stress have tended to accommodate frequent changes in food security, driven by both environmental change and subsistence-economic reorganization, often following regionally unique trajectories. Conversely, models addressing our species' history of infectious disease largely conform to a coarse-grained and globally generic typological account, focusing primarily on the demographic consequences of Neolithic and modern Epidemiologic Transitions. This paper presents an attempt to sync up the spatiotemporal scales of food- and infectious disease-focused population modeling, using a case study from the Kodiak Archipelago in the Gulf of Alaska. I present preliminary results of a time series analysis combining archaeological temporal frequency data with the GISP2-based paleotemperature record and time series data on regional salmon population dynamics and archaeofaunal abundances, as well as incoming archaeoparasitological data.

Browne Ribeiro, Anna (University of Louisville Kentucky)

[45] *"Um Lugar dos Antigos": A Tiered Approach to Community-Driven Survey in Cultural Palimpsests of the Brazilian Amazon.*

The Mouth of the Xingu River, on the Lower Amazon River, is a place of many histories. The edge of the Amazon Delta, it was the first Portuguese foothold in contemporary Northern Brazil, and later home to a "glorious" nineteenth-century rubber boomtown. Centered on the city of Gurupá, the region was a major hub in the traffic of Amerindians and also marked the Western extent of African slaving networks in Luso-Amaozonia. Part of the Cabanagem revolt, place of Amazonian Jewry, export center for forest products, and locus of labor struggles, Gurupá appears in travel documents as early as 1595. But the history of the place itself is largely unknown. Survey conducted during ethnographic fieldwork among descendant Maroon communities in the municipality of Gurupá reveals that this complex history manifests in material and immaterial forms. I present results from guided tours through three territories, in which local teachers and community members presented known and unknown "places of the old ones" that structure their lives, memories and histories. Using a GPS, trowel, soil probe, and notebooks, I attempted to map the places and stories onto Cartesian coordinate grids. Gurupá emerges as a multidimensional place of historical, cultural, political, and social intersection.

[64] *Discussant*

Bruchac, Margaret (University of Pennsylvania)

[138] *Digging for Shells: Recovering Indigenous Wampum Technologies in Museum Collections*

During the salvage anthropology era, more than 400 wampum belts (woven with whelk and quahog shell beads) were removed from the hands of Native North American keepers and accessioned into museum collections. Despite the existence of a complex system of wampum diplomacy and ritual, museums often represented these belts as almost indecipherable colonial relics. The "Wampum Trail" research team (with assistance from Native knowledge-bearers and ethnographic curators) seeks to reconnect these objects with Indigenous nations, using a range of restorative methods: archival research, object cartography, material analysis, and ethnographic interviews. Close visual studies of historic belts have revealed some heretofore unexamined physical details: anomalous beads (stone, bone, clay, glass, etc.); regional patterns of twining warp and weft; evidence of repair and reuse of components; and clear distinctions among historical and modern methods of bead manufacture and belt construction. In the past, antiquarians were so intently focused on the exotic, monetary and artistic value of wampum that they overlooked details that bespeak savvy Indigenous technologies. In the present, recovery of these details resolves questions of cultural continuity, in part, by providing evidence of discernable patterns of Indigenous curation in routine repairs, re-purposing, and even reconstruction of wampum belts over time.

[334] *Discussant*

Brugere, Cecile [45] see Colonese, Andre Carlo

Bruhns, Karen (Fundacion Nacional de Arqueologia de El Salvador)

[310] *Designer Antiquities: A Current Trend in the Not so Honest Antiquities Trade*

The fine art of creating new or composite styles of (supposed) antiquities has a long and ignoble history, beginning, as far as we know for the Americas, in the sixteenth century. It appeared again, full steam ahead, with "Tlatelolco Ware" in the late nineteenth century. Today, with increasing legal controls of antiquities importation and vending, this art has arisen again. Pieces claiming to be one thing while actually being entirely new stylistic creations, given the names of popular, but little known ancient cultures or even entirely made up, exotic names, are appearing regularly at European and North American galleries. Since so many art historians are determined to be ostriches as far as forgeries are concerned—indeed, their employment often depends on it—these utterly faux creations have begun to enter what passes as legitimate studies of precolumbian art to the detriment of everyone, save, of course, the dealers.

Bruno, Maria C. (Dickinson College)

[388] *Chair*

Bruno, Maria C. [95] see Weide, D. Marie

Bruns, Laura, Elizabeth Sobel (Missouri State University), F. Scott Worman (Missouri State University) and Jack Ray (Missouri State University Center for Archaeologica)

[89] *Osage Cultural Continuity and Change in the Contact Era: Evidence from the Flaked Stone Assemblages at the Brown and Carrington Sites*

Many traditional anthropological studies used acculturation theory to understand Colonial era Native American cultural dynamics. Acculturation theory assumes a process of gradual culture change through the adoption of European culture. More recently, anthropologists have incorporated additional concepts including agency, scales of analysis, and historical silencing to more productively investigate not only indigenous culture change but also continuity during the historic period. The project reported here uses these ideas in a study of contact era continuity and change as reflected in Osage flaked stone technology. This is accomplished through analysis of flaked stone artifacts from house features and surrounding areas at two historic Osage sites—Brown and Carrington. These sites are located in western Missouri and were excavated by the University of Missouri under Carl Chapman from the 1941 through 1982. We present the research problems, methods, study sites, artifact samples, and the results of this study.

Brunson, Katherine (Joukowsky Institute for Archaeology and the Ancient World, Brown University), Lele Ren (Lanzhou University) and Jada Ko (Harvard University)

[116] *Preliminary Faunal Analysis of Qijiaping, Gansu Province*

Qijiaping in Guanghe County, Gansu Province is the type site for the Bronze Age Qijia Culture (ca. 2200–1600 BC). In July of 2016, the Tao River Archaeological Project began small-scale excavations at Qijiaping. We present a preliminary analysis of the faunal remains uncovered during these excavations. Pigs and sheep were the most commonly identified specimens. Additional identified taxa include large bovines (probably domestic cattle), dog, deer, small rodents, and an unidentified wild bovid. Other notable findings include a fairly complete corvid skeleton and two divinatory oracle bones. Our analysis makes an important contribution to the limited zooarchaeological data for this period.

Brunson, Katherine [116] see Lyu, Peng

Brush, Emily (University of Wyoming), Lawrence Todd (GRSLE) and Rachel Reckin (University of Cambridge)

[88] *Analysis of an Obsidian Source from the Cougar Pass Region of the Absaroka Mountain Range*

Obsidian samples from a variety of sites across Northwest Wyoming have been sourced using X-ray fluorescence and analyzed in order to determine the importance of a relatively unheard of source from the Cougar Pass region of the Absaroka Mountain Range. Artifacts manufactured with obsidian nodules from Cougar Pass have been found in archaeological contexts across Northwest Wyoming, extending as far as a presently unknown kilometer range from their source. The wide range of specimens from a selection of sites within the Absaroka Mountain Range and surrounding areas demonstrate the varied use of the Cougar Pass obsidian source and highlight the rich archaeological importance of high elevation occupational areas. Further investigation into the use of the Cougar Pass obsidian source will help to determine the spatial-temporal significance of the region as a whole.

Brush, Emily [345] see Todd, Lawrence

Bryant, Jeff, Robert Feranec (Vertebrate Paleontology, New York State Museum), Nayeli Jimenez Cano (Biology, Universidad Autónoma de Madrid) and Marilyn Masson (Department of Anthropology, State University of N)

[44] *Investigating Seasonality of Fishing and Trade during the Maya Postclassic, with Otoliths Thin-Sections from the Inland Site of Mayapán*

This paper will offer preliminary results of fish otolith thin-section growth ring analysis from the Postclassic archaeological site of Mayapán, Yucatán, Mexico. This study offers the first use of otoliths for investigating seasonality of the fish trade in the Yucatán, utilizing perhaps the largest collection of otoliths from an inland site in the Maya world. Data on seasonality, age, and size of several fish species are presented, and discussed in the context of trade ethnohistory, ecology, and fish trade sourcing.

Bryant, Paula [341] see Hanson, Kelsey

Bryce, Joseph [181] see Lambert, Spencer

Bryce, William (Southwest Archaeology Research Alliance) and Michael L. Terlep (Logan Simpson)

[140] *From the Canyon to the Staircase: Expanding the Paleolithic Presence in the Arizona Strip*

Evidence of Paleoindian and Paleo-Archaic occupation of the Arizona Strip, in northwest Arizona and southwest Utah, largely remains limited to isolated projectile points found lying on the modern ground surface, dispersed across large swaths of land. Building upon the few isolated finds, this presentation discusses the recent identification of multiple fluted and unfluted lanceolate and Great Basin Stemmed projectile points. In contrast to the few previously known finds, the various projectile points and types presented here were spatially concentrated within a narrow 23 km (17 miles) corridor near Kanab Creek Canyon in northwest Arizona. After a discussion of the newly documented points we incorporate Paleoindian projectile points from the North Rim of the Grand Canyon and southern Grand Staircase-Escalante National Monument in southwestern Utah to provide additional data and inferences into the Paleoindian and Paleo-Archaic occupation of the Arizona Strip.

Brzezinski, Jeffrey (University of Colorado Boulder)

[82] *Recent Excavations at Cerro de la Virgen, Oaxaca, Mexico*

This paper presents the preliminary results of recent excavations carried out at Cerro de la Virgen, a 92-ha hilltop site located in the lower Río Verde Valley of coastal Oaxaca, Mexico. The lower Verde's first complex polity emerged during the Terminal Formative period (150 BCE—CE 250), during which Cerro de la Virgen was one of several secondary political centers distributed around the region's political seat, Río Viejo. Current research at Cerro de la Virgen is designed to study the negotiations that took place between secondary centers and polity leaders by examining the scale at which political, economic, and religious resources were controlled. Excavations carried out in the spring of 2016 targeted public and domestic architecture to examine resource control within communal and household settings. Preliminary evidence indicates that architectural patterns and ceremonial caching practices at Cerro de la Virgen differed significantly from those witnessed at other Terminal Formative sites in the lower Verde, including Río Viejo. These data suggest that the region's first complex polity collapsed at ca. CE 250 because hinterland populations were not integrated into the political system managed by leaders at Río Viejo.

Brzezinski, Jeffrey [82] see Barber, Sarah

Buchanan, Briggs [197] see Williams, Nancy

Buchanan, Kate (Western Washington University)

[186] *Castles and Their Landscapes: A Gravity Model Experiment*

Castle studies in recent years has developed two major themes in developing technology: landscape studies and spatial analysis. Studies of castle landscapes have shown that external spaces were intensively used and a significant part of the space actively portrayed as noble environment. Spatial analysis has been key in identifying spaces of control, privacy, and household interaction within the castle structure. One of the limitations of spatial analysis in castle studies is the failure to include external spaces as an option for social interaction. Including external spaces raises questions about

how the physical layout of the entire castle property affected the ways people interacted with these external features and which features and external spaces might be more attractive than others. Therefore, a methodology that includes the assessment of external spaces is sorely needed. This paper discusses the gravity model as a new method for analyzing the landscape features of castles in Scotland. This study also strives to open up a dialogue about new methods and technologies for quantifying interaction with the medieval noble landscapes.

Buchli, Jonas [40] see Iovita, Radu

Buck, Paul (Nevada State College/Desert Research Institute) and Donald Sabol (Desert Research Institute)

[250] *Sub-Pixel Detection of Obsidian and Pottery by NASA Satellite and Aircraft Data*

We determine the detection limits of sub-pixel artifacts (site midden, obsidian artifacts, and pottery) using airborne and spaceborne image data. Research results are presented from the Glass Mountain Site in northern CA and the Boquillas site in southern Arizona. Multiple visits were made at different seasons over three years. Visible, SWIR, and TIR spectral characteristics of targets and background were measured in the field. A spectral library has been constructed from ~200 target and background samples. The average density of these artifacts (per m²) has been calculated for 25 8 × 8 m squares and 10 4 × 4 m squares. Image data include: NASA's MODIS/ASTER airborne simulator (MASTER) imaging system, the Airborne Visible/Infrared Imaging Spectrometer (AVIRIS), and the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER). We (1) determined the detection limits of obsidian and ceramic artifacts at the sub-pixel scale; (2) examined the influence of background, seasonal vegetation change and other on-site changes on the detectability of these artifact types; (3) established the instrumentation, spatial scale, and spectral bands needed to improve the detectability; and (4) tested predictions of new locations for obsidian artifacts at specific (spatial) densities in other image scenes and ground truthed these predictions.

Buckberry, Jo [139] see Armit, Ian

Buckley, Gina (Pennsylvania State University), Rebecca Storey (University of Houston), Scott Hynek (Pennsylvania State University), Kenneth G. Hirth (Pennsylvania State University) and Douglas J. Kennett (Pennsylvania State University)

[8] *Diet and In-Migration in the Tlajinga District of Teotihuacán: New Insights from Stable Isotope Analysis and AMS Radiocarbon Dating*

Thirty years ago, the apartment compound known as Tlajinga 33 (33:S3W1) in the southern district of Teotihuacán was extensively excavated, resulting in the recovery of over 100 individuals. A paleodemographic study of these individuals indicated that chronic morbidity was a serious health issue among residents. Additionally, previous geochemical analysis from 25 of these individuals suggested that at least 29% of residents grew up outside of Teotihuacán. Due to chronic health issues, the movement of high numbers of in-migrants from outside the district into Tlajinga would have been important in order to maintain population numbers. In this new study of the Tlajinga district, both hypotheses concerning diet and in-migration are directly tested using stable isotopic analysis. Here, 25 additional individuals from Tlajinga 17 (17:S3E1), 18 (18:S3E1), and 33 are analyzed for carbon (δ¹³C) and nitrogen (δ¹⁵N) stable isotopes to better understand dietary variation between individuals. Stable oxygen (δ¹⁸O) isotopes and radiogenic strontium (87Sr/86Sr) are measured in human tooth enamel to estimate the extent of in-migration at Tlajinga. Additionally, AMS radiocarbon dates from bone collagen are used to build a more precise chronology. Results shed new insights into the demographic profile of the Tlajinga district.

Buckley, Gina [13] see Storey, Rebecca

Buckley, Michael

[85] *Zooarchaeology by Mass Spectrometry (ZooMS) and Rethinking a Definition of NISP*

Biomolecular methods can vastly improve the confidence in species determination of animal bone in a manner that, unlike traditional morphology-based methods, is not subject to the skills of the analyst. Until recently these have largely focused on ancient DNA-based approaches, and so have been at costs too great to become widely used for most archaeofaunal assemblages despite being available for more than 30 years. However, within the last decade I have pioneered the development of a low-cost biomolecular method of species identification based on using soft-ionization mass spectrometry to fingerprint enzymatic digests of collagen—the most abundant protein in bone. Termed “ZooMS” (for Zooarchaeology by Mass Spectrometry), appropriate given the speed at which objective identifications can be made with this approach, this approach in recent years has been applied to thousands of bone fragments in some cases. However, it remains unclear to what extent we can utilize such large-scale approaches beyond improving our understanding of the presence or absence of particular taxa. This presentation considers the advantages of ZooMS, including its temporal ranges across the planet and taxonomic resolution but more importantly its limitations, particularly in light of how to accommodate such highly enhanced NISP counts in archaeofaunal analyses.

Budar, Lourdes (Universidad Veracruzana)

[10] *Los puertos prehispánicos y los problemas político-económicos en la Costa Este de Los Tuxtlas, Ver.*

Recientemente, en la zona costera de la Sierra de Santa Marta en Los Tuxtlas, Ver., se lleva a cabo la investigación de un sistema portuario prehispánico. En esta contribución se mostrará visualmente el impacto político y económico que tuvo este sistema en la región.

[10] *Chair*

Budd, Tommy (Arizona State University)

[113] *A Biodistance Study of Shang Dynasty Human Sacrifice*

Ongoing archaeological investigations at the Shang capital of Yin Xu in modern Anyang have contributed much to the understanding of the Shang Dynasty (~1600–1046 BCE) and Bronze Age China. Bioarchaeological investigations of the thousands of sacrificed individuals recovered from the royal cemetery at Yin Xu has historically been somewhat limited, but is becoming an important component of current research at the site. Earlier work focused mainly on collection of craniometric data and the typology of collections. While bioarchaeology has moved away from typology and toward a more nuanced and contextualized understanding of population structure and history, the craniometric data collected and published with these earlier studies remain a valuable resource. This project uses this data to explore the structure and history of a sample of the population of sacrificed individuals at the site of Yin Xu using a biodistance approach. The structure and microevolutionary history of the sample are investigated in order to contribute to the understanding of the practice of human sacrifice by the Shang and the relationships between the Shang and those sacrificed.

Budden-Hoskins, Sandy (Archaeopots/UAISK)

[208] *Tracing Purpose: An Emic View of Pottery Making in Prehistory and Beyond*

Archaeologists have, until recently, tended to study pots in what I view as an outside/in or etic manner. We have looked at size, form, decoration and touched on the manner of making only insofar as a pot being hand-built, wheel-thrown, or cast. However, by developing a profoundly emic

understanding of potting, as performance, we have a tool that can allow us to view the entirely social and shifting cultural nature of a particular genre of pots. In 2007 I developed a skill methodology that has been used successfully on a number of European prehistoric assemblages. In 2015 the methodology was applied to the indigenous pottery of Taiwan, including that of the Paiwan. I will discuss the results of this research and what I believe it reveals about the shifting social nature of this pottery genre and what this may mean for an understanding of prehistoric pottery in Taiwan.

Budhwa, Rick (Crossroads Cultural Resource Management), Dana Evaschuk (Crossroads Cultural Resource Management), Donald Dixon (Canim Lake Indian Band) and Jocelyn Franks (Crossroads Cultural Resource Management)

[17] *Green Lake Burial Grounds: An Unprecedented Collaboration in Shuswap Territory*

Located atop the shores of Green Lake, and on Shuswap First Nation traditional territory, a First Nations burial site was slumping into the water. Long bones began emerging 40 years ago, when the local landowner was just nine years old. In 1997, archaeologists relocated one burial; but up to 15 individuals remained in this sliding cemetery. Since 1997, provincial government Archaeology Branch has worked toward moving those individuals. In July of 2013, Crossroads Cultural Resource Management worked in collaboration with other industry agencies and four First Nations to relocate these individuals. This project is historic in British Columbia, as Archaeology Branch acted as the client for the first time. Moreover, in another industry first, two distinct cultural resource management firms collaborated on the overall management of the project—one focused on archaeological recovery, and the other on sociocultural aspects of past and present peoples. The Canim Lake Indian Band has since purchased the site. They plan to make it into a memorial. The success of this project is attributed to the emphasis on intangible cultural aspects surrounding archaeological recovery and First Nations protocols, which will be the focus of this presentation.

[17] *Chair*

Buehlman-Barbeau, Savanna (University of Wisconsin-Madison, Anthropology), Kristin Carline (University of Louisiana at Lafayette, Anthropology), Jennifer De Alba (University of California Santa Barbara, Anthropol) and Erik Marsh (CONICET, Laboratorio de Paleo-Ecología Humana, UNC)

[231] *Excavation and Survey in the Argentine Andes: Preliminary Field Report of the First IFR Field School in Uspallata, Mendoza*

The first field school in the Uspallata valley, Mendoza, took place in 2016 and was organized by the Institute for Field Research (IFR). Its goals were to clarify the use of the landscape over the last two thousand years by people with an economy that incorporated hunting, gathering, small-scale agriculture, and possibility llama herding. Research was near one of Mendoza's best known archaeological sites, Cerro Tunduqueral. This site's dense rock art has been known for decades, but little is known about the people who made the engravings. Excavations at the adjacent cave site Tunduqueral 1 revealed 1.6 m of cultural deposits dominated by lithic artifacts and a major hearth feature. Ceramics were absent and faunal remains were poorly preserved, with the exception of Rhea Americana eggshell. Typologically early tools hint that the initial occupation was as early as the Middle or Early Holocene. Systematic surface collections in the same area revealed extensive concentrations of ceramics, ground stone, and lithics, remnants of activities in seasonally active alluvial plains. People's movements around the landscape probably included seasonal occupations of all three places: long occupations near streams, brief stays at the rockshelter, and making rock art at Cerro Tunduqueral.

Bueno, Marilyn [11] see Saldana, Melanie

Buff, Lindsay (Hamilton College), Nathan Goodale (Hamilton College), Heather Kendall (Stantec), David G. Bailey (Hamilton College) and Anna Marie Prentiss (University of Montana)

[50] *Sourcing FGV Artifacts Recovered from Housepit 54, Bridge River Housepit Village, British Columbia*

Geochemical analysis of trace elements in fine grained volcanic rocks (FGV) using HHPXRF technology allows elemental characterization that enables matching fine grained volcanic artifacts with their original toolstone sources. Excavations of Housepit 54 during 2013–2016 field seasons have yielded a large assemblage of FGV artifacts that we attempt to match with toolstone sources or outcrops in the region. Preliminary research on characterizing artifacts recovered during the 2013 field season through mineralogical and elemental analysis noted two dominant chemical groups, likely indicating two distinct sources. One of the distinct chemical groups of artifacts shares elemental similarity with the Arrowstone Hills volcanic deposits. During the summer of 2016, further field survey in the region identified several more possible local toolstone sources, including both young volcanic deposits and glacial deposits featuring fine grained volcanic cobbles. This paper further explores the use of FGV through the entire occupation of HP54, allowing an important understanding of shifting toolstone acquisition during the use life of the pithouse.

Buffalo, Johnathan [341] see Noldner, Lara

Bugg, Travis [301] see Terlep, Michael L.

Buhay, Bill M. (University of Winnipeg), Yadira Chinique de Armas (University of Winnipeg), Mirjana Roksandic (University of Winnipeg) and Roberto Rodriguez Suarez (University of Havana)

[30] *A Bayesian Model Sensitivity Study of Non-Static Diet-Collagen Isotope Fractionations Factors Used to Assess Breastfeeding and Weaning Practices among Fisher-Gatherers Populations, Western Cuba*

Reconstructing pale diets from bone-collagen isotope values (carbon and nitrogen) requires proper knowledge of diet-collagen isotopic fractionations ($\Delta^{13}\text{C}_{\text{diet-col}}$, $\Delta^{15}\text{N}_{\text{diet-col}}$). While these isotopic fractionations vary considerably among previous human pale diet reconstructions, some more recent studies have successfully employed "non-static" dietary offsets. New research suggests that non-static diet-collagen isotope fractionations is best when attempting to reconstruct pale diets of cultures consuming varied diets, particularly when used in association with a variety of new Bayesian multisource stable isotope-mixing models now available. This particular study involves a sensitivity study of some non-static diet-collagen isotope fractionations employed in three Bayesian multisource stable isotope-mixing models to assess breastfeeding and weaning practices among fisher-gatherer populations from Western Cuba.

Buhay, Bill M. [69] see Kanik, Nadine

Buikstra, Jane E. (Arizona State University) and Jason King (Center for American Archeology)

[31] *A Prism or a Mirror? Reflections of a Hopewell Man*

Interred within a deep, mounded and relatively elaborate tomb nearly two millennia ago, our Hopewell man lived approximately as many years as we have studied his remains. While his tissues have remained unchanged since excavation, our analytical gaze has witnessed near tectonic shifts in

theoretical perspectives. The first interpretations, those of the senior author in zealous pursuit of her doctoral degree, were decidedly processual and lacked reflexivity. She spoke of status, for example, identifying our subject as one who had controlled disproportionate resources in life and after death. Today, having absorbed the post-processual critique and currently engaging the challenges inherent in interpreting intersecting identities, we return to our Hopewell man and his Illinois River valley community. How has his/our viewpoint changed across so many theoretical approaches, informed as well by increasingly sophisticated analytical methods? In this presentation we first consider fundamental mid-twentieth century distinctions between bioarchaeological and osteobiographical approaches. Then we turn to interpretations colored by postprocessual visions of worldview. Finally, we enter a new osteobiographic interpretative arena informed by agency, embodiment, personhood, and identity theories. Our assumption throughout is that osteobiography is a prism through which we view a community—or perhaps it is a mirror?

[276] *Discussant*

Buikstra, Jane E. [102] see Charles, Douglas

Bull, Ian [367] see Shillito, Lisa-Marie

Bullard, Tom [140] see Cunnar, Geoffrey

Bullion, Elissa (Washington University in St. Louis)

[221] *Biological Diversity in Medieval Uzbekistan: Examining Community Expression under the Qarakhanid State*

This paper examines the expression of community during the Qarakhanid period (ninth–twelfth century CE) through a study of patterns of phenotypic diversity at medieval sites across Uzbekistan. The Qarakhanid dynasty is argued to be an integral period in the shaping of population, linguistic, and religious frameworks that shaped the social and ethnic landscapes of Central Asia up through the modern day. Historical sources suggest that the Qarakhanid rise to power instigated an in-migration of Turkic populations, the spread of Islam across the region, and the cultivation of Turkic language and culture. Little archaeological work has been done, however, to investigate how community interaction and expression was affected by these activities. In this study, geometric morphometric analysis of cranial shape is used to understand levels of biological diversity and association between groups at a collection of sites that cover a range of environmental, geographic, and economic contexts. Results indicate that biological expressions of community are variable across the landscape and are likely dependent on complex social and environmental contexts. This suggests that despite Qarakhanid sponsored cultural and religious campaigns, community expression was still in part mitigated by a range of variables, spanning economic, ethnic, and other social spheres.

Bullion, Elissa [29] see Frachetti, Michael

Bundala, Mariam [305] see Mercader Florin, Julio

Buonasera, Tammy (University of Arizona), Shelby Anderson (Portland State University), Shannon Tushingham (Washington State University) and Andrew H. Tremayne (National Park Service)

[173] *Animal Fats and Ancient Pyro Technologies in the North American Arctic: Contextualized Analysis of Lipids in Archaeological Sediments, Combustion Features, and Ceramics*

Processing and combustion of animal products including bone, fat, and oil for food and fuel was critical for human occupation of far northern latitudes. Remnant fats from these activities preserve exceptionally well in many Alaskan sites and various sources can be identified using standard techniques of lipid analysis. Combining lipid analysis with ethnographically informed experiments and high-resolution analysis of archaeological sediments, combustion features and ceramics, could help trace the use and processing of various animal products for food and fuel in Alaskan prehistory. Interpretive highlights of several recent studies will be discussed, as will directions for future analysis.

Burchell, Meghan (Memorial University)

[22] *Sustainable Research in Archaeological Science: Examples from High- and Low Resolution Biogeochemical Studies of Archaeological Shell*

Advances in archaeological sciences demonstrated the (almost) unlimited potential to apply new methods and techniques to existing and underutilized archaeological collections. Developing programs of research using innovative and multidisciplinary approaches to the analysis of material cultural, hard tissues, sediments and organic remains are critical to move the discipline of archaeological sciences forward. More critical, is the balance between technical skills one learns to become an 'archaeometrist' while still being rooted in contemporary anthropological theory. This paper discusses the results shell biogeochemical data, specifically oxygen and carbon isotopes and micro-growth patterns from sites across Canada British Columbia, Ontario and Newfoundland, revealing patterns of trade, seasonality, and landscape use over the past 6,000 years. By combining low- and high-resolution studies on hard-tissues, such as shell, bone and teeth from existing collections, archaeologists can build sustainable archaeometric research programs to develop new environmental proxies and interpret past cultural, historical and natural environments.

[223] *Discussant*

Burchell, Meghan [18] see Cook, Katherine

Burgess, Don [390] see Lyons, Patrick

Burgos, Walter [71] see Barrios, Edy

Burham, Melissa (University of Arizona)

[204] *Ancient Urbanites: The Spatial and Social Organization of Outlying Temple Groups at Ceibal, Guatemala*

Recent investigations of minor temple groups at Ceibal, Guatemala shed light on the social and spatial organization of ancient Maya cities. Many researchers suggest that minor temples were important integrative hubs in lowland Maya settlements. Because minor temples were constructed at regular intervals around the urban epicenter of Ceibal, it appears that they were integral to city planning, and likely the centers of localized communities.

Although they may have been discrete social units, the formation of these “intermediate” groups was crucial to shaping and sustaining the larger sociopolitical order. This research investigates community organization at Ceibal by: 1) assessing the existence of spatially-distinct residential zones organized in association with at least one temple; 2) evaluating variations in material culture across different residential zones; and 3) identifying local sources of water within each zone, which would have been important loci of routine interactions and crucial for supporting local populations. A diachronic assessment of multiple lines of evidence provides a basis for more clearly identifying and understanding how intermediate social groups at Ceibal formed and articulated with the larger society. More broadly, this paper provides methodological and theoretical approaches for studying different levels of community organization among the ancient Maya.

Burke, Adrian (Université de Montréal)

[216] *Traditional Knowledge and Lithic Sources in Northeastern North America*

Northeastern North America contains numerous lithic sources that are found in a variety of geologic and geographic settings. These materials vary widely in their knapping quality, color, texture, translucency, and block/cobble size. Access to these sources can also vary greatly, from underwater to the top of mountains. Aboriginal traditional knowledge allowed people in the past to navigate and use these varied sources. I present data from ethnographic and ethnohistoric documents that provide an insight into this traditional knowledge in precontact times. Toponyms point to lithic sources in the physical landscape that were known for generations. Oral traditions indicate that several sources in the Northeast possessed important symbolic meaning as part of the cultural landscape. I also explore how this traditional knowledge can help the archaeologist to better understand the exploitation of these lithic sources and their importance, whether symbolic or economic, to Aboriginal societies in the Northeast.

[216] *Chair*

Burke, Ariane (Université de Montréal), Colin D. Wren (University of Colorado) and Julien Riel-Salvatore (Université de Montréal)

[165] *The Social Consequences of Climate-Driven Changes in the Spatial Distribution of Human Populations during the Last Glacial Maximum (LGM)*

Risk-reducing strategies allow humans to manage ecological risk while minimizing disruptions. Unpredictable resource fluctuations, i.e., ecological risk, are driven by a combination of climate conditions and climate variability. Under extreme conditions reduction strategies may fail, however, forcing a reorganization of the social and economic structure of affected populations, as well as their technological systems. Risky conditions during the LGM, for example, affected the spatial distribution of populations in Western Europe as well as the ease and frequency of interregional mobility. This will have had an impact on human social networks and cultural exchange. Using predictive modeling, climate simulations and agent-based modeling, we explore how a risk-averse strategy created the spatial patterns observed in the archaeological record and consider their social consequences.

Burke, Chrissina C. (Northern Arizona University), Katie Tappan (Northern Arizona University), Gavin Wisner (Northern Arizona University) and Gregory Allen (Northern Arizona University)

[321] *Ritual Fauna Use in an Elite Ancient Maya Burial: Examination of an Animal Long-Bone Cache in the Recently Discovered Royal Tomb at Xunantunich, Belize*

Animal use in elite burials can provide a more holistic perspective on the importance of specific fauna as prestige goods or as status and power markers in the Maya world. This presentation discusses a discrete cache of animal long-bones located at the feet of a human burial recovered from the newly discovered royal tomb at Xunantunich during the 2016 field season of the Belize Valley Archaeological Reconnaissance (BVAR) project. Maya zooarchaeologists have long held that the use of specific species or the identification of right or left sided elements in ritual contexts can indicate cultural ideas of masculinity, power, or social status. This presentation discusses the results of analysis, specifically skeletal elements recovered, species identification, and taphonomic signatures present to determine if these faunal remains can contribute to our greater understanding of the individual buried in the tomb and help us better understand fauna in Maya ritual.

Burke, Chrissina C. [7] see Wisner, Gavin

Burkholder, Jo (University of Wisconsin–Whitewater)

[273] *Pisanay and the Endangered Rock Art Traditions of Arequipa, Peru*

Drawing on the archaeological excavations at the site of Pisanay, located in the Sihuas Valley of Arequipa (southern) Peru, this paper will situate the rock art at the site within the broader contexts of multiple rock art traditions in the region. These traditions include both painted and pecked images on rock surfaces, a wide variety of geoglyphs, mobiliary art, and sacred offerings made to particular rocks and geographic landmarks that represent huacas (loosely ‘holy places’). Within the boundaries of the Pisanay site, both pecked designs (petroglyphs) and mobiliary art have been found, but Pisanay also appears to occupy a central location within the broader sacred geography of the valley and surrounding pampa, a geography defined by a variety of geoglyph styles. The need to document, and hopefully date, these sites has increased in recent decades as the economic development associated with the Majes Irrigation Project, one of the largest in the world, has begun to endanger not only individual sites, but whole sacred landscapes. To date preservation efforts have been minimal, challenged by both economic forces and a lack of awareness of the rich rock art traditions.

Burks, Jarrod (Ohio Valley Archaeology, Inc.)

[283] *Mapping Residential and Public Space in Cahokia's Merrell Tract: Results of Recent Magnetic Surveys*

The Merrell Tract is located west of Monk's Mound and just outside downtown Cahokia. It is well-known for excavations of the famous Woodhenge at its west end and a large residential district at the east end. However, very little is known about what lies between. In 2012 and 2013, with logistical funding from the Cahokia Mounds Museum Society and the Illinois Association for Advancement of Archaeology, a large-area magnetic survey was undertaken to determine the density and extent of the area's archaeological features. Though their magnetic signatures proved to be quite subtle, many dozens of pit features and houses from various time periods were detected. Also notable are large areas lacking features. In this presentation I review the results of the magnetic surveys and situate them alongside earlier excavation data. These recent geophysical surveys continue a long tradition of the use of remote sensing data at Cahokia for examining site structure, and they further show the utility of even larger-area surveys.

Burley, David

[180] *Small Island Adaptations in the Initial Colonization of Fiji and Tonga*

Current research into the earliest Lapita occupation of Fiji and Tonga emphasizes the importance of small offshore island settlement choices for founder populations. Associated faunal data typically illustrate reliance on reef and marine resources that, in turn, have resurrected 1960s “strand looper” interpretations for Lapita economy, with little to no reliance on agricultural production. Recent studies at early Lapita sites at Kavewa (northern Fiji) and Nukuleka (southern Tonga) provide an alternative view, including use of freshwater wetlands and planting pits for reliable taro yields.

[123] *Discussant*

Burns, Gregory (University of California, Davis)**[381]** *Ancient Origins of Ethnographic Shell Bead Money in Central California*

Far from providing a bounty that obviated agriculture, the California acorn economy presented risks of secular variation more extreme than experienced by other densely populated hunter-gatherers. Decentralized political organization and high ethno-linguistic diversity further complicated redistribution of spatio-temporally variant resources. In the ethnographic period, shell bead money played a key role in enabling exchange. We examine changing patterns in bead manufacture and distribution through time to identify when and how beads took on this role, and suggest how the development of money may be tied to broader social and demographic developments in ancient California.

[381] *Chair*

Burns, Jessica L. [156] see Cooper, Catherine G.

Burns, Samuel (Independent Researcher) and Beau Kromberg (Wayne State University)**[91]** *A 3D Method for Measuring Platform Angles on Lithic Flakes*

The measurement of platform angles on lithic flakes by hand is notoriously difficult, and is plagued by intra- and inter-observer variability. The measurement method proposed in this poster uses 3D models of flakes loaded into Blender, a free open-source 3D design program. After identifying the platform, two points (a) and (b) are defined at the intersections of the left and right lateral margins and the platform. A line (a-b) is drawn between these two points, ignoring any platform roundedness or complex faceting. A line (d-e) is drawn that intersects the midpoint of line (a-b) at a 90 degree angle and that terminates in points (d) and (e) on the intersections of the ventral and dorsal faces with the platform. Next, a flat plane that bisects line (a-b) at a 90 degree angle is drawn through the flake. A point (f) can be chosen at any point where this plane intersects with the ventral and dorsal side of the flake, and the angle between line (d-e) and lines (d-f) and (e-f) can be accurately measured using built-in tools, giving a well-defined, replicable measurement of interior and exterior platform angles.

Burrillo, R. E. (University of Utah)**[371]** *Behind the Bear's Ears: Climate and Culture in the Early Pueblo Era on Elk Ridge, Southeast Utah*

The Pueblo I period was a time of tumultuous throughout the Four Corners region. Long regarded as an era of gradual transition, it is now recognized by most authors as a discrete and decisive turning point in North American prehistory. While this topic has been studied extensively in the central Mesa Verde area of southwestern Colorado, very little formal research has occurred for the early Pueblo era in southeast Utah. The high uplands area of Elk Ridge contains probably the greatest concentration of Pueblo I sites in this region. Cultural resource inventories on Elk Ridge itself, and an extensive published literature on nearby landforms like Cedar Mesa, comprise a useful dataset for investigating the early Pueblo archaeology of southeast Utah. This study presents a synthetic analysis of Pueblo I settlement patterning in the Elk Ridge area in terms of climatic and environmental factors.

Burrillo, R. E. [290] see Lewis, Michael D.

Burt, Amanda (Indiana University)**[127]** *Hard Fare: Investigating Dog Teeth to Interpret the Value of a Dog among Northwestern Plains and Rocky Mountains*

In this paper, Dental Microwear Texture Analysis is used to evaluate the teeth of dogs recovered from Late Prehistoric sites to investigate the idea that these animals had their natural diets modified by their human counterparts. This study compares microwear from wolves (*Canis lupus*) and coyotes (*Canis latrans*) to that of archaeological dogs recovered from various sites that represent human mobile groups of the Northwestern Plains and Rocky Mountains. Varied practices have been described in the ethnohistoric record, including Native groups intentionally provisioning their dogs as well as letting them subsist solely by scavenging. Understanding feeding programs as a proxy for the value of the dog among indigenous groups will contribute to continuing investigations on how dependent humans and dogs were on each other and the significance of dogs in general. Typical ecological models measure value as a compromise between what is given and what is received. This approach to understanding human behavior can be applied to the use of dogs and may inform fundamental anthropological questions about people and their environmental interactions in the past.

[127] *Chair***Busacca, Gesualdo (Stanford University)****[73]** *The Long Life of the Transient: Investigating Painted plasters at Çatalhöyük*

During the two decades of the Çatalhöyük Research Project, painted plasters have been investigated using a wide array of methodologies and theoretical perspectives, spanning from contextual to experimental approaches, and from iconographic classification to archaeometric analyses. While the transient character of Çatalhöyük paintings has often been discussed, the longer life-cycles of entire plaster sequences have rarely been investigated. Using a mixed methodology that combines block sampling, excavation tests, photogrammetric techniques (3D modeling and Reflectance Transformation Imaging) and archival research, a new dissertation project has started to investigate how painted surfaces at Çatalhöyük changed over time. For instance, how often were walls painted and where are painted layers placed in the sequence of plasters? How do earlier painted layers relate to later ones? Were paintings always covered by successive plaster layers or were they preserved and repaired in some cases? Preliminary research shows a remarkable variability in plaster sequences across the site and suggests that some paintings were less "transient" than others, being retouched and repaired after the first painting event. This paper will discuss these preliminary results and their implications on previous interpretations and research practices at Çatalhöyük.

Busby, Ashley (Texas Tech University)**[126]** *From Viewer to Observer: Analyzing Spatial Complexity of Pictographs in the Lower Pecos*

From Viewer to Observer will discuss the visual elements of the Pecos River style rock art, exploring the painting techniques and patterns that created these complex spaces. In addition, this paper will examine Lower Pecos pictographs through David Summers's Real Spaces, as well as other texts, to create a context within current and traditional art historical methodologies. In using Summers's idea of the spatially aware "observer" instead of the "viewer" I hope to expand the boundaries of the traditional composition to incorporate the physical space these works of art occupy, which enhance their spatial complexity as paintings. Analysis of the pictographs within their respective settings can deepen our understanding of the formal qualities of these paintings, and further, reveal interactions between image, surface, and surrounding space. By expanding our understanding of how meaning was communicated through the art and how it formed part of the culture within which it was produced, we gain insights into the cognitive behaviors which underlie Pecos River style imagery.

Büster, Lindsey (University of Bradford, UK) and Ian Armit (University of Bradford, UK)

[68] *Violence, Politics, and Power: Iron Age and Pictish Reinventions of a Prehistoric Mortuary Landscape at the Sculptor's Cave, NE Scotland*
 The Sculptor's Cave in NE Scotland saw a long history of use, from the Late Bronze Age to the Early Medieval (Pictish) period. Late Bronze Age activity is characterized, as in other caves along this stretch of coast, by complex communal funerary practices involving the exposure and processing of human bodies. Veneration continued for many centuries, yet by the Roman Iron Age (c. third century AD) perceptions of the cave had markedly changed. During this period, several adults were decapitated inside the cave, an event which can be situated in the political power struggles following Roman withdrawal from northern Britain. Scenes depicted on the nearby "Sueno's stone" attest to similar practices later in the Pictish period, and may even relate directly to those which took place in the Sculptor's Cave itself. The carving of enigmatic Pictish symbols on the cave walls in the Early Medieval period attests to the enduring memory of this place and the events which took place there. This paper will explore the changing use of the Sculptor's Cave and chart its contested role in this shifting political landscape.

Büster, Lindsey [139] see Armit, Ian

Bustos-Ríos, Diana (Posgrado en Antropología, UNAM) and Ana Itzel Juárez-Martin (UNAM)

[119] *Entre genes y memes: estudios de paleogenética de poblaciones en el México antiguo*
 El centro de México ha sido una región de convergencia y tránsito de ideas y mercancías desde la época prehispánica. Los grandes centros urbanos del Clásico y del Posclásico se caracterizaron por un constante trasiego que alcanzó desde el actual centro de México hasta Centroamérica. La intensidad de este intercambio desde épocas muy tempranas consolidó el complejo cultural mesoamericano principalmente identificado por la iconografía. Sin embargo no sólo las ideas y las mercaderías viajan, también las personas entran en contacto. Nosotros nos hemos dedicado al estudio de la variabilidad poblacional en el México antiguo a través de los estudios de ADN mitocondrial y proponemos que los ritmos de cambio y continuidad cultural tienen un impacto en la composición de las poblaciones: guerra, migración, cambios climáticos y nuevas alianzas comerciales y matrimoniales constituyen fenómenos incidentes en la deriva y el flujo génico. El análisis de las distancias genéticas y su contrastación con la información arqueológica e histórica permite conocer desde otro enfoque, la variabilidad de los grupos biológicos presentes entre los pueblos mesoamericanos. En el caso de estudio, estudiamos colecciones osteológicas de Teotihuacán, Templo Mayor, Cholula y Chichén Itzá.

Bustoz, Dave [335] see Watkins, Christopher

Butler, Amanda (University of Illinois at Urbana-Champaign)

[299] *Moving a Movement: Missions and Missionaries in Medieval North America*
 The relationship between cultural interaction and religion as a catalyst for long-term historical change is an underdeveloped line of inquiry in precolumbian archaeology. Particularly in North American archaeology, Mississippian cultural expansions and intrusions have been considered primarily in political or economic terms. Missionizing—defined as the intent to convert someone or something to a new idea or religion—in cultural and religious change may have facilitated the spread of a Mississippian religion from Cahokia, the only Native American city north of Mexico. The establishment and spread of a Cahokia-Mississippian religion can be seen as a religious movement differentially generated by many physical movements of persons, things, ideas, and substances. Archaeology is well suited to examine the fine-grained negotiation process of religious change. This paper focuses on one specific case study at the Collins site in East-Central Illinois and examines whether missionary practices were a catalyst for a religious movement.

Butler, Brian (Southern Illinois University)

[163] *Hopewellian Connections in the Midsouth: Tunacunnhee and Yearwood*
 In 1976 Richard Jefferies published on a Middle Woodland burial mound complex in northwest Georgia called Tunacunnhee. The previous year, Brian Butler salvaged an unusual Middle Woodland ritual and mortuary site on the Elk River in southern Middle Tennessee, called Yearwood, published in summary fashion in 1979. At the time, radiocarbon dating was too limited and primitive to get an accurate read on the age of these two sites, and the then available dates suggested a considerable difference in age despite many similar artifacts with Hopewellian connections. A reexamination of the Yearwood data along with new radiocarbon dates now permits a better appreciation of the correct age of Yearwood and the potential relationships of these and other sites.

Butler, Michelle (University of California, Riverside)

[82] *Shifting Practices: Materiality and Mortuary Ritual at Early Classic Charco Redondo*
 This paper explores the relationships between the people, objects and practices that created an Early Classic communal mortuary space at the site of Charco Redondo in the lower Rio Verde Valley of Oaxaca. The Early Classic follows the collapse of the first Rio Viejo polity, and significant differences in mortuary practices may signify a transformation in how power and authority were constituted. While communal internment continued, burials were generally undisturbed by later internments and individual offerings accompanied most burials as compared to communal caches and limited individual offerings in the Formative. Biodistance analyses also indicate that decedents were clustered according to phenotypic similarities. Entanglements between people, places, objects, and practices that engendered communal obligations and constrained strong social hierarchies in the Formative were being altered in ways that may have promoted individual and familial identities. The abundance of new materials used in mortuary ritual, such as Pachuca obsidian, likely also participated in the renegotiation of power and authority as more visibly hierarchical. The focus on individuals and dynasties is firmly established in the region by the Late Classic, a period that is in part defined by a rejuvenation of the Rio Viejo polity centered on elite rulership.

Butler, Michelle [82] see Joyce, Arthur

Butler, Virginia L. (Portland State University)

[228] *On the Ecodynamics of Fisheries at Tse-whit-zen*
 On the northern Pacific Coast of North America, fish play an extremely important role in conceptual models related to hunter-gatherer evolution and social dynamics of household production and resource control. Our ability to rigorously apply archaeo-fish remains to these models is limited by substantial data requirements including well-documented contexts, high-resolution chronology, control over complex site formation processes and taphonomy, as well as large sample sizes. The 2004 excavation and careful geoarchaeological documentation of micro-stratigraphic contexts from Tse-whit-zen provides an opportunity to study fine-grained patterns in the fishery in the context of abrupt environmental change. Over 112,000 fish remains were documented, including ~57,000 specimens identified to at least order, from seven chronostratigraphic zones and associated with two plankhouses and extramural activity areas. Herring represent over 50% of the identified specimens, with 20+ taxa also present. While some variation in fish use is

seen across social units and activity areas and through time, the main trend is stability. Given the fine-grain analysis, stability appears to be real, rather than an artifact of lumping multiple discrete occupations into large time blocks.

[150] Discussant
[228] Chair

Butrón, Ashuni E. Romero [44] see Tucker, Carrie

Button, Kerry [2] see Rosenthal, David

Buttress, Angela

[263] *Abalone in the Archaeological Record of Barkley Sound*

This report focuses on the northern abalone (*Haliotis kamtschatkana*) recovered in the 2016 excavation of Hup'kisakuu7a (Site 93T) in Pacific Rim National Park. This study combines an analysis of the data recovered through archaeological excavation and column sampling at 93T, a review of neighboring archaeological site reports, and the collection and measurement of a modern assemblage of abalone shells. The aim was to answer three research questions: first, how ubiquitous is the presence of abalone in the archaeological record at 93T; second, how does the ubiquity of the abalone recovered at 93T compare to other sites in Barkley Sound; third, is it possible to estimate the size of archaeological abalone using a modern collection? It was determined that abalone is present in 5.6% of the levels examined at 93T, which represents the lowest ubiquity found among the six archaeological excavations reviewed. An assemblage of 22 modern abalone shells was used to create a regression model representing the relationship between hole measurements and total shell length with the intent of allowing researchers to estimate the total shell size of an abalone fragment found in the archaeological record. The strongest of these regressions can explain 59.45% of variability in shell length.

Buvit, Ian

[140] *A Source and an End: Hokkaido, Sakhalin, and the Peopling of Beringia*

After nearly a century since confirming Pleistocene humans in North America, having taken a few misguided turns along the way, our discussions about First American origins remain focused on late glacial northeast Asia. While questions persist about exact timing and means, geographically, Beringia is central in terms of routes. Recent genetic literature describes a standstill or isolation when a series of distinct Native American lineages formed prior to movement south of the continental ice. While Beringia is a highly possible location for this event, we argue it was more likely the Paleo-Sakhalin-Hokkaido-Kuril (PSHK) Peninsula where geochronological evidence points to Last Glacial Maximum (LGM) refugia and where inhabitants produced a highly diverse suite of lithic tool kits. This was followed, however, by a period that coincides with the so-called standstill when nearly all PSHK sites produced only microblades. Moreover, the appearance of microblades in Eastern Beringia 14±1 ka (and the end of the standstill) was coeval with their demise on the peninsula. We contend technological variability in the earliest American assemblages and the genetic standstill hypothesis is best explained with roots on PSHK.

[6] Moderator
[253] Discussant

Buvit, Ian [332] see Terry, Karisa

Buzon, Michele (Purdue University) and Sarah Schrader (University of Notre Dame)

[219] *Comparison of Nubian and Egyptian Patterns of Physical Activity at New Kingdom Tombos*

Tombos, located at the Third Cataract of the Nile River in Sudan, was established as an Egyptian colonial site in Nubia during the New Kingdom period. Burials provide evidence for high level Egyptian administrators and support staff as well as local community members. Previous investigations of the Tombos remains have indicated that individuals buried at Tombos participated in relatively low levels of strenuous physical activities, indicative of roles such as administrators, scribes, and craftspeople. This study examines the differences in physical activities via enthesal remodeling and osteoarthritis in subgroups at Tombos. Strontium isotope analysis is used to differentiate locals from first generation immigrants, craniometric analyses are used to separate Egyptian and Nubian biological groups, and Egyptian/Nubian ethnic patterns are viewed via burial ritual. Though sample sizes are small, results indicate that Nubians may have been engaged in more strenuous manual labor than Egyptian individuals at Tombos. While most individuals in the overall Tombos population show few signs of hard labor, these results suggest that Egyptians may have participated in less physical roles, such as administrators, while Nubians had other tasks such as craft production.

Byerly, Ryan M. (Far Western Anthropological Research Group, Inc.)

[305] Chair

Byerly, Ryan M. [152] see Lebovich, Liat

Byers, David [181] see Owens, Andrew

Byl, Sylvie [358] see Praet, Estelle

Byrd, Brian (Far Western) and Adrian Whitaker (Far Western)

[381] *Did Increased Landscape Management through Pyrodiversity Lead to a Rise in Deer Procurement in the San Francisco Bay Area?*

Some of the earliest archaeological applications of human behavioral ecology were Central California studies of faunal resource depression by Jack Broughton including a detailed study of the massive Emeryville Shellmound, located on the east shore of San Francisco Bay. An intriguing pattern identified by Broughton was a significant increase in the relative abundance of deer in the later occupational strata at Emeryville. Broughton attributed this shift to the initiation of distant-patch hunting and supported this attribution with body part representation data. Recent research along the Central California coast at Quiroste Valley has highlighted the role of native Californians in maintaining a diverse and highly productive mélange of habitats through controlled burning. We seek to examine whether there is a faunal signature that provides evidence for similar burning in the San Francisco Bay Area and if so, whether this might provide a complementary explanation to Broughton's distant-patch foraging. We hypothesize that controlled burning of

the hills adjacent to the Emeryville Shellmound would have enhanced habitat in a manner that increased deer populations and also made deer more regular targets for hunters from Emeryville. Finally, we discuss the broader implications of landscape management on prehistoric foraging in Central California.

Byrd, Brian [294] see Younie, Angela

Caballero Ochoa, Andrea Alejandra [225] see López Luján, Leonardo

Cabello, Gloria [216] see Ballester, Benjamín

Cabrera, Oralia [13] see Carballo, Jennifer

Cabrero, Teresa (Shaft Tomb)

[23] *La piedra verde como motivo de la colonización del Cañón De Bolaños en el Occidente de México*

Uno de los factores más importantes para la colonización del cañón de Bolaños fue la necesidad de establecer contacto de tipo comercial con el área de Chalchihuites donde se explotaba la codiciada piedra verde o malaquita. Lograron su objetivo a través del establecimiento y control de una ruta comercial que atravesaba la región de Bolaños; la adquisición y redistribución de la malaquita primero; y la turquesa después, por todo el occidente de México fue el eje rector de su economía. La turquesa cuyos yacimientos se encuentran en Nuevo México, la adquirían mediante el contacto con los integrantes de las caravanas de comerciantes provenientes del Centro de México a través de la ruta comercial del interior.

Cagnato, Clarissa (University Paris 1-Panthéon Sorbonne), Olivia Navarro-Farr (College of Wooster), Griselda Pérez Robles (Proyecto Regional Arqueológico El Perú-Waka'), Juan Carlos Pérez Calderón (Proyecto Regional Arqueológico El Perú-Waka') and Damaris Menéndez (Proyecto Regional Arqueológico El Perú-Waka')

[174] *Feeding the Mountain: Plant Remains from Ritual Contexts on and around Structure M13-1 at El Perú-Waka'*

Structure M13-1, a major civic-ceremonial building at the center of the Classic Maya city El Perú-Waka' in northwestern Petén, Guatemala, held special significance to its citizenry. While it was likely ritually significant since the Early Classic period, evidence indicates it was the focus of sustained and repeated ceremonial acts of likely varying scales, accoutrement, and practitioners throughout the Late and Terminal Classic periods (circa AD 600–900). In this paper, we explore data from recent paleoethnobotanical analyses pertaining to numerous archaeologically documented contexts revealing that plant remains were among the offerings in various of these ritualized contexts. The contexts in question date to the Late Classic period and include a subterranean chamber, a fire shrine, and the tomb of the Late Classic Queen Lady K'abel. Even after El Perú-Waka's royal court declined in the early ninth century AD, Wakaños continued to ritually engage Structure M13-1, blanketing the structure in a variety of offerings ranging from gargantuan stela fragments to now nearly imperceptible plant remains. Paleoethnobotanical evidence, in conjunction with other archaeological data, provides key information regarding ancient ritual practices in the Maya region, in this case shedding light on how the Maya metaphorically fed this particular structure.

Cagnato, Clarissa [274] see Lamoureux St-Hilaire, Maxime

Cai, Dawei (Research Center for Chinese Frontier Archaeology), Quanxia Chen (Research Center for Chinese Frontier Archaeology), Hui Zhou (Research Center for Chinese Frontier Archaeology) and Dongya Yang (JLU-SFU Joint Laboratory for Bioarchaeological Res)

[116] *Ancient DNA Analysis of Early Neolithic Cattle from Houtaomuga site, Northern China*

The Houtaomuga site is located on the east bank of Xinhuangpao Lake, in Da'an County, Jilin Province, Northeast China. According to the archaeological excavations, the Houtaomuga site can be divided into seven phases from the early Neolithic to the Late Bronze Age (8000–2050 BP). Although many Bos skeletal remains were found in the phases Houtaomuga III (6300–5500 cal. BP) and Houtaomuga IV (5000 cal. BP), it was very difficult to identify to the species level. In this study, ancient DNA analysis of Bos remains was utilized. Our results showed that most Bos specimens belong to mtDNA Haplogroup C of wild Bos primigenius which was never domesticated in China. Only one sample from phase IV belongs to Haplogroup T3 of domestic cattle that originated in the Near East. Our research provides new insight into the origin of Chinese cattle.

Cain, Tiffany (University of Pennsylvania)

[280] *Formative Experiences: Everyday Life and Political Violence in Yucatán, 1847–1866*

How can we study political violence in the archaeological record? How does it impact civilian spaces and how can we rethink its consequences for everyday life? This paper argues for the interpretive value of civilian landscapes for the study of violent conflict. The tendency to treat political violence as an event (e.g., the Caste War of Yucatán) in archaeology, rather than a prolonged sociopolitical episode or process, impoverishes our archaeological theorization of violence: violence is forced to enter a sphere of exceptionalism, positioned outside of the “everyday.” Yet, such violence is not confined to the battlefield or other archetypal conflict spaces. It enters into the domestic sphere and assaults civilian population centers. Here, I present the preliminary findings of an archaeological study of the postconflict landscapes of Quintana Roo, Mexico. I focus specifically on evidence likely representative of the early years of the Caste War or Maya Social War (1847–1901). I show that when we reconsider the common material proxies of war—fortification and abandonment—in a way that recenters ordinary people, we position ourselves to understand not only the mechanics of war but the transformative effect of political violence on people's lives and the landscape.

[280] *Chair*

Cajigas, Rachel (University of Arizona)

[110] *Discussant*

Çakırlar, Canan [27] see Marston, John

Caldwell, Megan (University of Alberta), Dana Lepofsky (Simon Fraser University) and Robert Losey (University of Alberta)

[380] *Ecological, Archaeological, and Social Perspectives of Northern Coast Salish Marine Resource Management Systems*

Coastal peoples around the world have complex systems of marine management that are situated within and influenced by a myriad of social and ecological actions and contexts. On the Northwest Coast of North America, as elsewhere, understanding the physical and non-tangible aspects of these systems requires using diverse kinds of knowledge and data. In this presentation, we bring together traditional ecological knowledge of Tla'amin First Nation elders with archaeological data to understand the marine resource management systems of the Northern Coast Salish of southern British Columbia. Our archaeological data include fish and shellfish remains from middens, and the spatial distribution and forms of associated intertidal stone and wood features. By analyzing the archaeological evidence through a series of nested spatial scales, and combining these analyses with Tla'amin knowledge of marine ecosystems, we show how ancient systems of management ensured equal access to and sustained use of a suite of marine resources throughout the late Holocene.

Calfas, George [124] see Fay, Kathryn

Cali, Plácido [292] see Sallum, Marianne

Callaghan, Michael (University of Central Florida), Daniel Pierce (University of Missouri) and William Gilstrap (University of Missouri)
[9] *Integrated Compositional Analysis of Lowland Maya Middle Preclassic Pottery at Holtun, Guatemala*

The archaeological site of Holtun is an intermediate sized Maya civic-ceremonial center with documented occupation from the Middle Preclassic through Terminal Classic periods (800 BC–AD 900) featuring well-preserved cultural deposits in multiple contexts. Previously, NAA was conducted on an assemblage from the Middle Preclassic ceramics in which four discrete compositional groups were identified. One such group in particular was composed almost exclusively of Mars Orange Paste Ware, a product thought to be from Belize, while the other groups are assumed to be of local production. As a complement to the previous study, samples from each compositional group, representing both local and imported assemblages, were analyzed using ceramic thin section petrography. Resulting petrographic fabrics were then compared to locally sourced geological materials. This paper presents the interpretation of the combined petrographic and chemical composition studies in an attempt to better characterize local products and to further our understanding of the source and means of transportation of Mars Orange Paste Ware found in Middle Preclassic ceramics at Holtun. Finally, this study provides new insight into the production technologies of lowland Maya Middle Preclassic pottery, with a special emphasis on the use of volcanic ash temper.

Callaghan, Richard (University of Calgary)
[180] *The Strategic Location of the Maldives in Indian Ocean Maritime Trade and Colonization*

The Maldives Islands, situated off the southwest coast of India, form a chain trending from north 6.930° to south 0.700° latitude, an extent of approximately 850 km. The chain divides the Indian into east and west as well as marking the divide between the seasonal monsoon weather patterns. Present evidence suggests that the island chain was occupied as early as the fifth or fourth century BC with close ties to India. The islands became strongly culturally and commercially connected to both Asia and Africa after Islam was brought to the archipelago in the twelfth century. Beginning in the sixteenth century they became increasingly important to European colonial powers. Their location is strategic for maritime trade in the Indian Ocean. Here computer simulations using wind and current data and sailing vessel performance characteristics are used to evaluate the possible routes traders and colonists may have used that relied on the Maldives particularly in the earlier periods of occupation. The chain provides a convenient way station while waiting for favorable shifts in the monsoon winds. The Maldives may have been particularly important in the colonization of the Comoros Is. and Madagascar and the east African Indian Ocean trade.

Callaghan, Richard [296] see Cush, Patricia

Calligaro, Thomas [23] see Querré, Guirec

Calvo, Sílvia [23] see Molist, Miquel

Camacho-Trejo, Claudia
[119] *The Legacy of a Tlamatini: H. B. Nicholson's Mesoamerican Archive*

H. B. Nicholson was considered the Tlamatini of Aztec studies. He was also known as a warm and generous professor who dedicated his life to the study of Mesoamerican cultures. His legacy is highlighted by his remarkable collection of articles, books, photographs, and slides acquired over more than five decades. After his death in 2007, Nicholson's family donated his entire private collection of books, articles, slides, and photographs to the University of California, Los Angeles. Five years ago, when that university was deaccessioning much of his collection, part of it was given to California State University, Los Angeles (CSULA). The gift included Nicholson's entire slide archive of more than 10,000 slides of published and unpublished images. For the past years, a group of CSULA students has worked to digitize these slides to organize and preserve the valuable and sometimes rare information that they contain. This paper will report on the content of the digitized archive and the importance of H. B. Nicholson's legacy to Mesoamerican studies.

[119] *Chair*

Cambra, Rosemary [30] see Gardner, Karen

Camp, Anna (University of Nevada, Reno)

[367] *Mats, Trays, Bowls, and Patches: Results from the Analysis of over 9,000 Years of Catlow Twine Basketry in the Archaeological Record*
 Catlow Twine is a unique and diagnostic basketry type found in archaeological sites of the Great Basin and some parts of California. It has a relatively wide geographic distribution and is thought to have over ~9,000 calendar years before present (cal BP) of technological continuity. Through the reexamination and recording of specific attributes and the direct Accelerator Mass Spectrometry (AMS) dating of Catlow Twine basketry from sites in Nevada, California, and Oregon, I have observed these continuities and some discontinuities in this basketry type, and propose that Catlow Twine basketry had significant technological and personal significance to the people who manufactured it. The value of this type of basketry can be seen in the size and types of vessels that were made, the fineness of the weave, and the use and reuse of Catlow Twine baskets. These specific attributes observed through time and space demonstrate how basketry can be used as a cultural and technological marker in the archaeological record.

Camp, Stacey (University of Idaho)
[98] *Discussant*

Campana, Michael G. [181] see Ferrari, Giada

Campbell, John [52] see Deal, Michael

Campbell, Rachel (Missouri Department of Transportation)
[283] *Building the Wall: Excavations of Cahokia's East Palisade*

The East Palisade Project at Cahokia Mounds State Historic Site is an ongoing investigation with the main goal of fully determining the path of the multiple construction phases of the palisade walls surrounding the core of the site. Located in Ramey Field, just east of Monks Mound, excavations have occurred intermittently in this area since the 1960s. The study of the area has helped in the understanding of the construction of the palisade walls as well as the varying types of bastions used throughout the occupation of the site. The East Palisade Project has also hosted Cahokia's Volunteer Field School allowing the public to participate in archaeological investigations. This paper will summarize the history of the palisade excavations and the results of recent investigations.

Campbell, Ross (University of Georgia), Russell Cutts (University of Georgia), David R. Braun (George Washington University) and J.W.K. Harris (Rutgers University)

[154] *Statistical Evidence for a New Method of Identifying Anthropogenic Fire in the Archaeological Record*

Clarifying evidence for anthropogenic fire in the archaeological record has been subject to contention and vagueness. This uncertainty centers not on evidence for fire, rather what constitutes it being human-controlled. New research pursuing this question suggests that a peculiar angular fragment, termed thermal curved-fractures (TCF), are the byproduct of knapped materials (flakes, cores, bifaces) exposed at length to high heat. We present here results of experiments expanding our TCF database designed to test hypotheses: a) are TCFs significantly, statistically, distinct from unfired debitage, and b) are there potential TCFs residing in archaeological collections from sites purported to have evidence of (early) hominin-controlled fire? These results strongly indicate support for both hypotheses.

Campbell, Roberto (Pontificia Universidad Catolica de Chile) and Ismael Martínez (Independent Researcher)
[340] *4,000 Years of Animal Translocations: Mocha Island and Its Zooarchaeological Record*

Islands are territories that allow us to assess phenomena and processes in a way that is impossible to do in the mainland. One of these concerns the human interaction with animals that are usually considered as wild. The case of Mocha Island (Chile; South Pacific, 38,36°S) is remarkable because of its small size (50 km²), proximity to the mainland (30 km), three different and independent human occupation events, and an endemic terrestrial fauna constituted only by small reptiles, amphibians, and rodents. Here our research has shown the distinctive presence of translocated medium-to-large native mainland mammals—nutria (*Myoscastor coypus*), pudu (*Pudu pudu*), camelids (*Lama* sp.), fox (*Lycalopex* sp.), grison (*Galictis* sp.), and wild cat (*Oncifelis* sp.)—in relation to the different populations that have occupied this island: aceramic hunter-gatherers (1950–1300 BC), ceramic food-producers (AD 100/1000–1687), and Chilean tenants (AD 1840–today). This evidence leads us then to question the simple idea of “wild animal,” and opens up a set of much more complex and rich issues, such as wild management and the use of “living reservoirs,” the re-creation of known landscapes, the modification of landscapes, local extinctions, pet keeping, taming, and even the consideration of animals as nonhuman persons.

Campbell, Sarah K. (Western Washington University), Erin Benson (Indiana University), Brendan Culleton (Pennsylvania State University) and Douglas J. Kennett (Pennsylvania State University)

[228] *Habitat Change versus Human Impact: Size and Frequency Trends in Multiple Taxa of Marine Invertebrates at Tse-whit-zen Village*

Tectonic activity along coastlines can subtly or radically alter the substrate and elevation of the intertidal zone, thus affecting benthic marine invertebrates; however, there is no single signature for impacts. Research following mega-earthquakes in the last decade shows that the nature of the effects varies widely across taxa and locations. Analysis of the Tse-whit-zen village invertebrate fauna shows that mean sizes of bivalves of the genera *Macoma*, *Leukoma*, *Saxidomus*, and *Tresus*, and also of the gastropod *Nucella lamellosa* and the chiton *Katharina tunicata* vary significantly, and independently across seven chronological zones spanning the last ~2,200 years. Taxonomic abundance of these and other frequently harvested bivalves such as *Mytilus* and *Clinocardium* also vary significantly between these relatively short occupation periods that are bracketed by known tectonic events and global climatic warming and cooling events. To evaluate the relative influence of tectonic events and human harvesting, these empirical patterns are compared to expectations for which taxa should be impacted in parallel or inverse ways deduced from predator/prey relationships, habitat preferences, and constraints on colonization and growth. The effects of climate change on ocean temperatures are controlled for using a high-resolution shell isotope sequence developed from site-specific samples.

Campeau, Kathryn (University of Toronto), Tracy Prowse and Tristan Carter

[22] *Differentiating Commingled Human Remains through EDXRF (Energy Dispersive X-ray Fluorescence)*

The ability to differentiate commingled skeletal remains is critical in the analysis of mass burials, archaeological sites and mass fatality events in forensic cases. The potential application of EDXRF (Energy Dispersive X-ray fluorescence) to aid in differentiating commingled remains is being explored at the MAX Lab (McMaster Archaeological XRF Lab), expanding the lab's research focus from solely obsidian sourcing to include bioarchaeological applications. There are numerous factors affecting bone's chemical composition; consequently, an individual's bones should have a unique elemental characterization which can be determined using EDXRF, a quick, nondestructive technique. Drawing upon Gonzalez-Rodriguez and Fowler's (2013) research which utilized a portable XRF (pXRF), the hypothesis that it is possible to differentiate individuals based on their unique chemical composition was tested using EDXRF on three archaeological skeletons from southern Italy. Applying multivariate statistical analysis, PCA (principal component analysis), to acquired data, it was possible to show distinct elemental variations and groupings among these skeletons. Trace elements, and ratios thereof, provided a greater distinction between the individuals than major elemental concentrations. Current research involves applying this method to a set of commingled remains expected to contain three individuals, in order to determine whether they can be differentiated.

Campeau, Kathryn [22] see Carter, Tristan

Campetti, Casey (AECOM) and Christopher Adams (U.S. Forest Service—Gila National Forest)

[4] *Metal Sensing and Indigenous Copper from Isle Royale National Park and Gila National Forest*

Though much professional work utilizing metal sensing comes from within the historic period and battlefield archaeology, the application of metal sensing techniques to precontact sites has much to offer contemporary studies of copper use in the United States, particularly inter- and intrasite geospatial analyses of indigenous copper exploitation. Ongoing research in two U.S. regions is illustrative of the contributions metal sensing technology is making to studies of copper and copper technology. Recent work at relict shoreline sites on Isle Royale National Park in northern Michigan and Mimbres sites within Gila National Forest in New Mexico serve as case studies highlighting new insight into copper exploitation in the northern Lake Superior Basin and the American Southwest.

Campos, Cinthia M. (California State University, Los Angeles)

[386] *An Interpretation of the Rock Art in La Cueva de la Huachiza, Santa Clara del Cobre, Michoacán*

The Cueva de la Huachiza is a tectonic cave formed within a basaltic flow in the municipio of Salvador Escalante just south of Lake Pátzcuaro, Michoacán. The cave was initially recorded in 2014 by Dr. Jose Luis Punzo-Diaz as part of Proyecto Arqueología y Paisaje del Area Centro Sur de Michoacán (PAPACSM). An investigation of the cave conducted this summer recorded pecked petroglyphs of a man facing an eagle, above a spiral motif. These motifs resemble those from contact period Codice de Carapan. In front of the petroglyphs a feather and burnt wood were recovered that are described in La Relación de Michoacán as sacred items. This paper will combine archaeology, ethnography, ethnohistory, and epigraphy to interpret the cave. The inscriptions and artifacts found within offer insights into Tarascan customs, ceremonies, and beliefs. The evidence suggests La Cueva de la Huachiza was a perceived as landmark in the sacred landscape and as having connections with Cumiechuquaro, the underworld. It is evident that this cave was an important religious site for the Tarascans, and future explorations will produce a better understanding of the use of caves in this largely understudied region.

[12] *Chair*

Camurri, Erica

[132] *Monte Bibele (Monterenzio, Italy): Analyzing Patterns of Cultural Interaction between Celts, Etruscans, and Other Italic Populations in Northern Italy from the Fourth to the Second Century BC*

The site of Monte Bibele, located near Bologna (northern Italy), contains the remains of a settlement on Pianella di Monte Savino and a necropolis on Monte Tamburino, altogether dating from the fifth to the second century BC. According to historical sources, this region was inhabited by Etruscans and other Italic populations, before it witnessed the invasion of Celtic tribes from the fourth century BC onward. Following these sources, the main consequence of the invasions has to be seen either in the assimilation or in the expulsion of the local groups by the Celts, just prior to the Roman conquest of northern Italy. Recent studies of the epigraphic record and the archaeological documentation of the region indicate a reality that is more complex and dynamic than previously assumed. Based on the site of Monte Bibele, which has to be considered one of the best documented archaeological sites of the area, I will demonstrate that the different ethnic groups mentioned in ancient sources were in fact coexisting, reaching in some cases such a profound level of social and cultural interaction that it is difficult (if not impossible) to determine their ethnic identity: Were they Celts, Etruscans, Italics, Etrusco-Celts/Celto-Etruscans, or something else entirely?

Canaday, Timothy (Salmon-Challis National Forest), Bryan Hanks (University of Pittsburgh) and Roger Doonan (University of Sheffield)

[343] *The Middle Fork Geophysics Project, Central Idaho*

The Middle Fork Salmon River is a designated Wild and Scenic river located within the heart of the Frank Church—River of No Return Wilderness in central Idaho. Over the last three years the University of Pittsburgh, the Salmon-Challis National Forest, and the University of Sheffield have collaborated on a minimally invasive multi-method geophysical and geochemical approach for characterizing intact archaeological deposits at seven prehistoric sites impacted by recreational activities. The objective of this work is to develop long-term management strategies for the protection of at-risk sites using minimally invasive methods such as fluxgate gradiometry, earth resistance electrical resistivity, magnetic susceptibility, and handheld portable XRF for soil chemistry. Preliminary results from several of the sites are presented.

Candan, K. Selçuk [227] see Kintigh, Keith

Cannon, Aubrey (McMaster University) and Andrew Roddick (McMaster University)

[22] *A Culture of Innovation in Archaeological Science at McMaster University*

Archaeological science has exploded globally in the past several decades, a pattern that is evident in the range and sophistication of scholarship at a variety of Canadian institutions. McMaster University, however, has played, and continues to play, a particularly important role in the development of archaeological science. In this introductory paper, we explore the genealogy and early impact of a number of pioneering scholars at McMaster. We highlight the pivotal role of the Canadian Foundation for Innovation (CFI) in enabling the development of groundbreaking laboratory facilities for archaeology. We outline what we describe as the “cultural transmission” of the practice of archaeological science. What began with early pioneering developments in methods and applications was refined through the construction of CFI funded facilities. These spaces have permitted the emergence of new research applications at McMaster and, through graduates who have extended this legacy of innovation, at other institutions in Canada and internationally. We also argue that the diversity of archaeological science research at McMaster has been maintained with a particular anthropological focus. As will be seen in the papers in this session, exploring social questions of the past requires both analytical skill and a sophisticated theoretical awareness.

[314] *Discussant*

Cannon, Aubrey [22] see Carter, Kari

Cannon, Danielle (Kutztown University), Carly Plesic (Kutztown University) and Khori Newlander (Kutztown University)

[259] *Provenance Analysis of Pottery Sherds from an Early Nineteenth-Century Milling Village in Northeast Pennsylvania*

As a cost-effective and nondestructive method for multi-element analysis, portable X-ray fluorescence spectrometry (pXRF) has the potential for broad archaeological application. Here, we employ pXRF for the compositional analysis of pottery sherds collected from Stoddartsville, an early nineteenth-century milling village built along the upper Lehigh River in northeast Pennsylvania. Our analysis demonstrates that we can use compositional data to source pottery sherds to regional potteries, documenting the links developed between Stoddartsville and the surrounding region as the village grew into a short-lived center of trade and industry. At a more general level, our study demonstrates the potential for historical archaeologists to use compositional data, even in the absence of makers' marks, to source historic artifacts and, in turn, develop insights into regional economies.

Cannon, Mike (SWCA Environmental Consultants) and Sarah Creer (SWCA Environmental Consultants)

[79] *Patterns in the Transport of Tosawihi Chert to the Little Boulder Basin, Northern Nevada*

The Tosawihi chert quarries of northern Nevada have played a significant role in the development of hypotheses by Great Basin archaeologists about precontact procurement and transport of lithic raw materials. Here, such hypotheses are tested using data obtained from ongoing investigations in the nearby Little Boulder Basin. These investigations have resulted in the analysis of chipped stone assemblages from dozens of site loci, which consist primarily of Tosawihi chert and many of which can be dated to phases or periods in the local cultural historical sequence. Little Boulder Basin Tosawihi chert assemblages exhibit a classic "distance decay curve" and are consistent with the hypothesis that quarrying activity—specifically the amount of time spent processing material at the quarries—was constrained by transport distance. Further, temporal differences in processing and transport patterns are evident that are likely related to broader late Holocene changes within the region in foraging and mobility practices.

Cano, Martha [226] see Lopez, Carlos

Canterbury, J. Alex [162] see Trask, Willa

Canuto, Marcello A. (M.A.R.I./Tulane University)**[131] *Preliminary Lidar-Based Analyses of the La Corona–El Achiotal Corridor***

Located in the northwestern Petén, Guatemala, the Maya sites of La Corona and El Achiotal have been investigated since 2008 by a multidisciplinary U.S. and Guatemalan research project. While a primary goal of this project has been to reconstruct the region's political history, we are now beginning to investigate the management of local resources and general human impact on the landscape. In fact, the area between La Corona and El Achiotal is almost entirely unknown archaeologically, especially regarding settlement that is largely residential and dispersed due to the wetland environment. In 2016, a LIDAR survey, funded by the Pacunam Foundation and operated by NCALM, was undertaken in nearly 200 km² rectangular zone encompassing both La Corona and El Achiotal. This survey aims to record the full extent of ancient settlement around and between these two sites and cast light on land-use strategies in a region dominated by seasonal and perennial wetlands. In the following paper, we will present the preliminary results and interpretations of the LIDAR dataset focusing both on the methodological advantages of this technology and on the possibilities it creates for analysis and interpretation of ancient landscapes.

[131] *Chair*

Canuto, Marcello A. [39] see Bell, Ellen

Cap, Bernadette (University of Texas-San Antonio)**[7] *Implications for Spinning Thread in a Marketplace at the Classic Maya site of Xunantunich, Belize***

The identification of marketplaces among the Classic Maya has contributed to more complex understandings of their economies, but scholars are still working to determine the fundamentals and variations of Maya marketplace exchange across time and space. Recent investigations at the Classic Maya site of Xunantunich, Belize recovered a small assemblage of spindle whorls from the site's Lost Plaza, a posited marketplace. This the only example among the Classic Maya to directly connect the activity of spinning thread with a physical marketplace, from which I infer that thread was part of the marketplace exchange system. Classic Maya artwork provides examples of a variety of textiles, but due to tropical conditions few traces have been left of the production process. Spindle whorls represent one of the most durable lines of evidence for textile production. This poster presents details of the spindle whorl assemblage and associated features and soil chemical signatures to understand the activity of spinning thread within the Lost Plaza. Broad economic implications of thread as a marketplace good are also discussed. In Mesoamerica, spinning and weaving is depicted primarily as a female activity. The Lost Plaza assemblage provides an opportunity to discuss the role of gender in marketplace exchange.

[269] *Discussant***Capellin Ortega, Anarrubenia P. (Graduate Center, CUNY), Cameron L. McNeil (Lehman College and the Graduate Center, CUNY) and Edy Barrios (CUDEP-USAC)****[71] *Investigating Ancient Foodways in the Copan Valley: Macrobotanicals from Late Classic, Terminal Classic, and Postclassic Middens in the Río Amarillo East Pocket***

In this paper, the analysis of macroremain samples from household contexts in the Río Amarillo East Pocket will be discussed. The analysis of these samples is part of a larger project to define the use of the environment by ancient inhabitants of the valley. Following upon the efforts of earlier projects such as PAC I and PAC II, we plan to assess macroremains from a diversity of groups and time periods to illuminate ancient consumption patterns. Hopefully, this data will increase our understanding of the sustainable practices of the ancient Maya and allow us to assess possible evidence of environmental stress related to Terminal Classic demographic drops.

Capone, Patricia**[138] *Museum Archaeology and Studying Technology***

Increasing combinations of perspectives and epistemologies contribute knowledge and consciousness of practice to the study of technology. Museum archaeology is well situated to study and interpret technology through material culture, archives, and engaging partnerships. Partnerships through museum collections continue to build and contribute to a variety of interests. The interdisciplinary direction of technological studies continues to expand. Projects also increasingly relate to forward thinking topics such as sustainability, and consciousness of practice. Examples of partnerships with various collections including the Peabody Museum, Harvard University demonstrate the advancement of knowledge in this area.

Capriata Estrada, Camila (Proyecto Qhapaq Ñan—Ministerio de Cultura del Perú) and Raúl Zambrano Anaya (Proyecto Qhapaq Ñan—Ministerio de Cultura del Perú)**[292] *Nieve Nieve, a Local Rural Community under Spanish Rule***

The archaeological site of Nieve Nieve is located in the middle Lurin Valley, Central Coast of Peru. The spatial configuration of this site differs drastically from other late prehispanic settlements in the valley. The presence of a colonial church as well as a series of architectonic compounds built along parallel and perpendicular streets not only indicate a well-planned construction but also the introduction of a new, and probably foreign, urban design. Yet, other aspects such as the construction techniques and internal distribution and use of spaces remain essentially local. We will present the results of our excavations at the site suggesting a strong permanence of local cultural elements during the first years of colonial times.

Capriles, José M. (Pennsylvania State University), Nicholas Tripcevich (University of California, Berkeley), Axel Nielsen (CONICET, Instituto Nacional Antropología y Pensamí), Michael D. Glascock (University of Missouri Research Reactor) and Calogero M. Santoro (Universidad de Tarapacá)

[88] *Geochemical Characterization and Archaeological Utilization of the Cerro Kaskio Obsidian Source in Southwestern Bolivia*

Obsidian is not only an excellent raw material for the manufacture of stone tools but because of its compositional homogeneity, it can also be related to specific geographic sources. The geochemical characterization of obsidian sources can help to determine the geographic origin of different stone tools as well as aid to infer patterns of resource utilization and exchange. Although some of the most important obsidian sources in the Andes have been identified and adequately characterized, many remain unknown. Here we report for the first time, the location, description, geochemical characterization, and regional distribution of Cerro Kaskio, a new obsidian source from southwestern Bolivia. We show how artifacts made with Cerro Kaskio obsidian were initially utilized by some of the first explorers to enter the territory during the late Pleistocene but also by subsequent populations of pastoralists during the late Holocene. Given the singular composition, high-quality, and long-term use of this source, we anticipate that additional sites with stone tools made with Cerro Kaskio obsidian will be identified in the future.

Capriles, José M. [134] see Valenzuela, Daniela

Caracuta, Valentina (Laboratory of Archaeobotany and Paleoecology-University of Salento, Italy), Bridget Alex (Department of Human Evolutionary Biology, Harvard), Lior Regev (D-reams Radiocarbon Laboratory, Weizmann Institute), Eugenia Mintz (D-reams Radiocarbon Laboratory, Weizmann Institute) and Elisabetta Boaretto (D-reams Radiocarbon Laboratory, Weizmann Institute)

[338] *The Ice-Age Landscape around Manot Cave (Israel) during the Upper and Middle Paleolithic: New Insights from the Anthracological Record and Carbon Isotopes Analyses*

Since 2012, a series of investigations in Manot Cave recovered charcoal samples from archaeological layers in order to study the landscape around the site between the Upper and the Middle Paleolithic (UP/MP). Samples of soils and loose charcoal were collected in different areas of the cave, while particular attention was paid to the sampling of the hearths found in Area E and I. Anatomical features of the charcoals were analyzed using a metallographic microscope in order to identify tree species which grew in the site area at the time of its occupation. *Amygdalus* sp. was found to be the most common species, while *Quercus* ssp. (type *calliprinos* and *ithaburensis*) are comparatively rare. The anthracological study reveals the presence of an open forest, during the UP/MP, which differs from the modern maquis. Over thirty specimens of *Amygdalus* sp. were radiocarbon dated at the D-REAMS laboratory and subject to stable carbon isotopic analysis ($\delta^{13}C$) to obtain information on the local rainfall regime between 50,000 and 30,000 years cal BP. These analyses indicate climatic conditions during the ice-age were unlike modern conditions.

Caracuta, Valentina [338] see Boaretto, Elisabetta

Caraher, William [37] see Averett, Erin

Caramanica, Ari

[382] *A History of Landscape Transformation and Environmental Change across the Ascope Irrigation System of the Chicama Valley*

The sequence of landscape transformation across the area of the Ascope Canal System in the Chicama Valley involved both natural and anthropogenic events and processes that unfolded in nonlinear ways. We argue that early events were crucial in determining transformations later in the sequence. In the arid environment of the North Coast, water availability plays a key role in landscape histories. This paper highlights evidence for El Niño events, water management, and changing ecologies for the Paleoindian period through the Colonial period in the area, drawing from sedimentary, archaeobotanical, survey and ethnohistorical data. Retracing both the human and natural histories of this landscape reveals both their interdependence and the potential impact that early modifications had on later outcomes.

[382] *Chair*

Carballo, Jennifer (Harvard University, Peabody Museum) and Oralia Cabrera (Arizona State University)

[13] *Altica Ceramics and Figurines: Stylistic and Chronological Analyses*

Craft specialization and exchange feature prominently in explanations for the development of the first complex societies in Mesoamerica. It is clear from analyses of surface collections at Altica that during the Early and early Middle Formative periods (c. 1300–850 BC) its inhabitants exported obsidian tools and imported pottery from long distances, including the southern Gulf Coast. Altica is one of the few early agricultural settlements located in the northern Basin of Mexico from which we have excavated ceramics and figurines, and thus provides an important opportunity to investigate early craft specialization, including the interregional exchange of obsidian and ceramics. Employing a multi-scalar approach, we investigate differences in the uses and styles of newly excavated ceramic vessels and figurines from Altica, focusing particularly on objects decorated with symbols of ideological importance. We also compare these materials to pottery and figurines at contemporary sites. This study provides evidence of how the first sedentary communities of the Basin of Mexico participated in an extensive network of societies exchanging goods, ideas, and decorative motifs, during a significant period of increasing sociopolitical complexity.

Card, Jeb C. [395] see Fowler, William

Card, Jeb J. (Miami University)

[212] *Witches and Aliens: How an Archaeologist Inspired Two New Religious Movements*

Egyptologist and Folklorist Margaret Murray was a major figure in the creation of professional archaeology in the United Kingdom, President of the Folklore Society, and advocate for women's rights in higher education. However, another major part of her legacy was the mainstream acceptance of the concept of the "witch-cult," a hidden ancient religion dating back to the Pleistocene but continuing until at least the seventeenth century when it was persecuted by witch-hunters. Historians have subsequently found this concept to be unsupportable but it is still commonly found in the popular imagination. One obvious legacy was the role of the witch-cult in the formation of Wicca and other neopagan movements in the second half of the twentieth century. But another major product of Murray's archaeologically informed witch-work was the Cthulhu Cult, created in fiction by science fiction and horror pioneer H. P. Lovecraft. Not only has Lovecraft's Mythos inspired direct Lovecraftian magickal practices, but it has been a huge influence on paranormal and conspiracy beliefs centered around ancient civilizations and hidden secrets. Through these influences, core elements of early anthropology have persisted and grown outside of the professional establishment.

[212] *Chair*

Cardinal, J. Scott (New York State Museum) and Jennifer Loughmiller-Cardinal (State University of New York)**[287]** *Through the Gates of Logic, into the Middle of . . . What?*

For several decades, middle ranged theories in archaeology have generally been understood and applied as a set of rhetorical and analogical linkages between the archaeological record and interpretive hypotheses of behaviors. Epistemologically, however, "middle range" has broader implications than this relatively narrow archaeological application. As a relative positioning, middle range denotes establishment of logical linking arguments between evidence and inferred or hypothetical context irrespective of theoretical scale. Archaeologically, these typically relate to inverse trajectories of causality (i.e., from effect to cause), but have potential be much more than mere methodological steps or analogies between field data and conclusions. Properly conceived, middle ranged theories should link data, through explicit or inferred causal mechanisms and sets of observations, to broad or generalized theoretical abstractions. The latter step has traditionally been difficult to achieve with contemporary social theory as it is engaged and applied by archaeologists, leading to a broad disgruntlement with higher-level social theory and abstractions. We propose that this has been, in part, due to the overly narrow and insufficient applications of formal logic to middle-ranged linkages beyond the methodological scale, and present a suggested restructuring of archaeological middle range for identifying reasonable inferences at higher scales.

Cardona, Héctor [215] see Cardona Machado, Hector

Cardona Machado, Hector (El Colegio de Michoacán, A.C.), Héctor Cardona (El Colegio de Michoacán, A.C.), Verenice Y. Heredia Espinoza (El Colegio de Michoacán, A.C.) and John K. Millhauser (North Carolina State University)**[215]** *La Obsidiana en el Occidente de México: "Ausencias" en la opulencia*

La región de Tequila es reconocida por la elaboración de una famosa bebida alcohólica, sello de la mexicanidad actual. Pero a partir de investigaciones arqueológicas realizadas en la zona desde hace más de un siglo, se ha reconocido la abundancia de fuentes y tipos de obsidiana que fueron utilizadas en época prehispánica para la fabricación de bienes tanto de lujo como para uso cotidiano. Esta actividad ha sido un componente importante de las narrativas académicas que procuran definir dinámicas que apuntan a la complejidad social desde el Formativo, siendo uno de los rasgos fundamentales de la propuesta de la Tradición Teuchitlán. Bajo este modelo, la obsidiana ha sido tratada como un "recurso raro," que debió ser controlada por la élite y que originó una red de intercambio, tanto regional como a larga distancia, lo que caracterizaría un tipo particular de economía incrustada en una organización estatal. Sin embargo, la evidencia empírica referida no señala un control sobre este recurso ni sobre la manufactura de artefactos, como tampoco a la naturaleza de las relaciones de intercambio. En este trabajo se evalúa tanto los datos como sus interpretaciones, proponiendo enfoques alternativos a la luz de nuevas teorías arqueológicas.

Cardoso, Hugo (Simon Fraser University), Joana Abrantes (University of Porto), Laure Spake (Simon Fraser University) and Luis Rios**[86]** *A Test of Juvenile Age Estimation Methods Based on the Diaphyseal Length of the Long Bones*

Little work has been done on whether juvenile age estimation methods perform well beyond the population that was used as a reference. This study uses a sample of 81 known-age juvenile skeletons, aged between birth and 12 years, combining data from archaeological, anatomical and forensic reference collections in the United States, Canada, and South Africa. Ages were estimated from the diaphyseal lengths of the humerus, radius, femur and tibia, using Cardoso et al. (2014) and Stull et al. (2014) prediction models. Results show that methods based on size are only reliably applied across samples before the age of two years, after which population differences in growth become noticeable. Results also show that ancestry-specific bone size and limb proportions have little if any effect on the reliability of age predictions. The main factor to consider when selecting an age estimation method is population nutritional and health status, not ancestry. These findings have important implications for age estimation of juvenile skeletons in archaeological contexts, and suggest that bone size is not a reliable age predictor, particularly after the age of two years.

Cardoso, Hugo [193] see Tarle, Lia

Carey, Genevieve [394] see Guilfoyle, David

Carey, Mia (University of Florida)**[122]** *I Don't See Color, but I See Your Hijab: How Public Archaeology Can Confront Race, Racism, and Islamophobia in Social Science Education*

Millennials are hailed as one of the most racially progressive generations in America's history. African Americans and other people of color are becoming consciously aware of the challenges that they face in navigating America as a minority. White millennials, who describe themselves as being racially progressive, typically lack awareness or understanding of discrimination and racism and use colorblindness as a way of coping with fear and ignorance. Their colorblindness invalidates the identities and experiences of minorities, and equates color with something negative. This leaves white millennials ill-equipped to deal with changing classroom demographics and the knowledge and experiences that minorities bring to the classroom. By embracing a culturally relevant pedagogy aided by archaeology, young, white social science educators can begin to bridge the gap by confronting their own white privileges and inherent biases.

Carrillo Bosch, Vania [329] see Magnoni, Aline

Cariño Anaya, Tanya [329] see Magnoni, Aline

Carleton, William (Simon Fraser University), Mark Collard (Simon Fraser University) and Dave Campbell (Simon Fraser University)**[77]** *Radiocarbon Dating Uncertainty Constrains Our Ability to Identify Cyclical Human-Environment Dynamics*

Archaeologists have long been interested in cyclical human-environment dynamics. This interest is indicated by the dozens of published studies that refer to "adaptive cycles" and by the fact that one of the highest cited papers in the history of archaeology focuses on the impact of cyclical drought on the Classic Maya. Unfortunately, recent work suggests that identifying cycles in archaeological and paleoclimatological time series data can be challenging when the observations are dated with radiocarbon assays. The problem is that the highly irregular, temporal uncertainties that are characteristic of calibrated radiocarbon dates can lead to the identification of spurious cycles. In the present study, we sought to delineate the conditions under which cycles can be confidently recognized in radiocarbon-dated time series datasets. To do so, we conducted simulation experiments involving thousands of artificial time series with known cyclical patterns, varying the parameters of each experiment to determine when radiocarbon dating uncertainty became too great to allow for the reliable detection of the known cycle. We found that, at best, we could correctly identify cycles only 42% of

the time, indicating that the temporal uncertainty of calibrated radiocarbon dates makes it very difficult to identify cycles in archaeological and environmental records.

Carline, Kristin [231] see Buehlman-Barbeau, Savanna

Carlson, Catherine
[311] *Discussant*

Carlson, David (Texas A&M), Angelina Perrotti (Texas A&M University), Michael Waters (Texas A&M University) and Jessi Halligan (Florida State University)

[81] *Modeling Age and Sedimentation Rates at the Page-Ladson Site*

Stone tools and mastodon bones occur in an undisturbed geological context at the Page-Ladson site, Florida. Age models were created for excavation unit 50N/23E and core PLAD-AUC14-4A to estimate age ranges and sedimentation rates. The models were constructed using Bayesian models as implemented in OxCal to calibrate ages, combine equivalent age estimates, exclude outliers, and estimate deposition rates. The models were used to provide age estimates for artifacts recovered from the site, correlate deposition at the site with the Late Pleistocene transgression, and provide influx estimates for *Sporormiella* spores as proxy evidence for the presence of megafauna. Taken with other evidence, the analysis demonstrated that about 14,550 years ago people butchered or scavenged a mastodon next to a pond in a bedrock sinkhole within the Aucilla River. This occupation surface was buried by approximately 4 m of sediment during the late Pleistocene marine transgression, which also left the site submerged. Peak concentrations of *Sporormiella* occur around ~13,700 cal y BP may indicate peak megafaunal abundance in the vicinity of the sinkhole. A rapid decline in spore concentrations by ~12,600 cal y BP occurs after the onset of the Younger Dryas Stadial.

Carlson, Justin (University of Kentucky)
[253] *Discussant*

Carlson, Kristen (Augustana University)

[332] *Bull Creek: A Paleoindian Camp in the Oklahoma Panhandle*

Bull Creek is one of a handful of Paleoindian camps, which has survived the taphonomic consequences of time. In this presentation we will discuss our current understanding of the site and its inhabitants. The topics discussed include environmental reconstruction and the broader use and reuse of the surrounding region by Paleoindian people. Snapshots of butchering techniques have been captured at Bull Creek as well as differential seasonal use of the site. After the third season of excavation Bull Creek is beginning to provide a picture of life in the Oklahoma panhandle as early as 10,300 years ago.

[332] *Chair*

Carlson, Kristen [332] see Bement, Leland

Carlson, Meredith (Bryn Mawr College), Jonathan S. Reeves (George Washington University), David R. Braun (George Washington University) and Matthew Douglass (University of Nebraska—Lincoln)

[154] *An Experimental and Archaeological Investigation of the Role of Edge Angle in Lithic Artifact Damage: Applications to the Koobi Fora Fm. Kenya*

The analysis of damage patterning on lithic artifacts has the potential to distinguish between predepositional use of artifacts and postdepositional taphonomic processes, providing important evidence for particular hominin behaviors. Previous study has suggested that damage accrues in a non-random fashion in archaeological assemblages. Limited work has been done using the quantified variable of edge angle to account for patterns of edge damage. This study focuses on assemblage-level patterns of flake edge angle and their relationships to macroscopic damage. Experimentally produced lithics were subjected to different use and taphonomic treatments. This provided a means for investigating the relationship between edge angle and damage across a variety of different processes. Preliminary results suggest the pattern of damage across edge angles varies based on the processes of use or taphonomy to which an assemblage is subjected. These results were compared to damage patterns of surface collections from two Okote Member (1.6 -1.39 Ma) sites in the Koobi Fora Formation, Kenya exhibiting both ancient and modern instances of edge damage. We use this dataset to explore the extent to which experimental edge damage/angle relationships conform to archaeological data. An overview of potentially diagnostic angle/damage relationships is presented. Research sponsored by NSF-IRES (OISE-1358178 and 1358200).

Carlson, Risa (U.S. Forest Service)

[49] *Raised Marine Predictive Model Advances Knowledge of Early Holocene Site Assemblages in Southern Southeast Alaska*

In 2009, Carlson and Baichtal used the age and elevation of raised marine deposits left during the highest marine transgression to create a hypothetical early Holocene shoreline in the Alexander Archipelago of southern Southeast Alaska. Over the past seven years, archaeological surveys that employed this predictive model revealed over twenty new early Holocene sites. Our understanding of the Holocene island landscape has increased dramatically with the discovery of these sites in new geographical areas of the archipelago. The sites are directly upland of the ancient shoreline that dates from 9,300 to 7,000 RCYBP. They are characterized by dense lithic deposits in and around carbonaceous hearths that include microblades, microblade cores, small unifacial tools of curated materials, flake cores, large expedient unifacial flake tools, utilized flakes, and byproducts of bifacial tool production. Microblades and simple unifacial tools were modified in multiple ways to perform a variety of tasks. A small component of fauna includes burnt and calcined bones, worked sea mammal bones, marine shells, and fish and bird bones. These new sites expand on traditional characterizations of artifact assemblages and material types used for tool production during the early Holocene in Southeast Alaska.

Carlson Dietmeier, Jenna (College of William and Mary)

[248] *Carolina's Cattle: Eighteenth-Century Livestock Production at Drayton Hall*

Utilizing faunal evidence from two assemblages from Drayton Hall, this paper explores the changing cattle husbandry strategies employed in the eighteenth-century South Carolina Lowcountry. Before colonists had perfected rice production in the region, they worked with the varied terrains and natural resources of the Lowcountry to create a very successful livestock industry in the early eighteenth century. Cattle remains from the Pre-Drayton assemblage (circa 1730s) reflect this thriving livestock industry, indicating that cattle were raised at the site for market in a largely free-range system. In contrast, cattle remains from the South Flanker Well assemblage (circa 1770s) suggest cattle being raised in a more hands-on manner, with some individuals likely serving as draught oxen. Through analyses of general species distributions, kill-off patterns in cattle, and pathologies present on the

cattle cranial and lower limb elements at Drayton Hall, one can appreciate the changing relationships between humans and cattle in the eighteenth-century Carolina Lowcountry.

Carlucci, Eric (Indiana University- Bloomington), Jianfeng Cui (Peking University) and Ling-Yu Hung (Indiana University- Bloomington)
[213] *Portable XRF Analysis of the Pigments of Majiayao Pottery from Dayatou, NW China*

The site of Dayatou is located on a terrace bluff in the Tao River Valley in Gansu province, Northwest China. In 2015, the Tao River Archaeological Project team conducted systematic collection across the surface of the bluff and recovered thousands of Majiayao culture potsherds. To identify the technology and provenances of these potsherds, in the 2016 field season we used a portable XRF in a handheld configuration to analyze the chemical elements of the black paint decorated on 124 selected samples. For comparison, we also used the same method to analyze the paste composition of each sample. All the samples had enough clear painted and unpainted spots for analysis. These samples were selected from random bags of sherds collected from areas across the site. Different from previous studies, our case study provides a micro perspective on the technology and organization of pottery production at a single settlement. Portable XRF analysis proves to be an effective source for this research because of the efficient and accurate chemical identification. The data we have collected provide a general overview of the site, and will lend to future research on ceramics at the site of Dayatou, and for the Majiayao as a whole.

Carmichael, Patrick

[270] *Really Ugly Nasca Pots of Ancient Peru, and Why They Are Important*

Polychrome ceramics of the Nasca culture (south coast of Peru, c. 100 BC–AD 600) are world renowned as one of the most colorful and artistically complex creations of the ancient Americas. Up to ten distinct colors depicting fabulous supernatural creatures adorn unique vessel forms with eggshell thin walls fixed in perfect oxidizing firings. Such masterpieces fill art books and spawn enthusiastic but fanciful speculations about Nasca society and its artisans. This paper rounds out the view of Nasca pottery production and its place in society by focusing on what is not shown in art books—the remarkably ugly, poorly made, and badly fired products of neophytes and the ungifted. Such pieces provide valuable information on the construction, painting, and firing stages of production, but also lead us to consider the individual potter as agent, the family workshop, and the potting community. The role of polychromes in Nasca society was potent. An informed understanding of their production, circulation, use, and deposition must include not only the brilliant and spectacular but also the unsightly and hideous.

Carmody, Stephen (Sewanee: University of the South), Ryan Hunt (Rhodes College), Jera Davis (Office of Archaeological Research, Moundville Stat), Natalie Prodanovich (Rhodes College) and Jon Russ (Rhodes College)

[173] *Inhaling Prehistory: Exploring the Smoking Culture of the Eastern Woodlands*

Pipes, pipe-smoked plants, and the tradition of smoking in the Eastern Woodlands of North America have long interested anthropologists and archaeologists because these artifacts and activities are viewed as material correlates of ritual, ceremonial, and religious activities. While pipes are regularly recovered from archaeological sites, the remains of plants materials that were smoked are far more difficult to recover. Traditionally, pipe-smoked plants, such as tobacco, have been identified through the analysis of macroremains recovered from archaeological sites. The earliest comes from Middle Woodland period contexts at the Smiling Dan site in Illinois. However, pipes themselves predate evidence of tobacco in the region, leaving many questions unanswered about the smoking culture. Over the past two decades' chemical analysis of pipe residues have made substantial contributions in this area. A chemical signature for nicotine identified in a pipe from West Virginia demonstrated the efficacy of gas chromatography/mass spectrometry (GC/MS) and pushed the earliest dates for tobacco use back approximately 2,000 years. Here, we present the results of our recent GC/MS study on pipe residues from the region. We use these results to contribute to ongoing investigations into the timing, transmission, use, and customs surrounding tobacco and the smoking culture.

Carney, Molly

[177] *Gene-Culture Coevolution, Pit Hearth Cooking, and the Diabetes Epidemic among North American Indigenous Populations*

While the diabetes epidemic among indigenous Native American populations has been examined for more than 30 years, the nuances between environmental and genetic causes of this disease remain understudied. In this paper, I explore the idea that the diabetes epidemic among Native American populations may be partially attributed to the introduction of a diet suited for Westernized populations. I will specifically look at gene-culture coevolution and the salivary amylase gene (AMY1) copy numbers among different world populations, arguing that populations with higher AMY1 copy numbers are better adapted to digest starchy foods such as wheat, rye, millet, or rice. Conversely, many Native American populations used technological adaptations such as pit oven cooking to process the sugars found in native root foods, thereby bypassing the need for genetic adaptation. I examine two populations, in the American Southwest and in Mexico, to illustrate these differences in native and introduced diets and their subsequent health effects. By looking at gene-culture coevolution, the ethnographic record and archaeological evidence, we are better able to address some of the causes for the high prevalence of diabetes among Native Americans.

Carney, Molly [260] see Downey, Caitlin

Carpenter, Jennifer [77] see Jackley, Julia

Carpenter, John (Centro INAH Sonora) and Guadalupe Sanchez (Instituto de Geologia-UNAM/INAH)

[84] *El Corrido de Pablo y Suzy Pescado: Inspiring Archaeological Investigations in Northwest Mexico*

We discuss Paul and Suzy Fish's integral role in archaeological research in northwest Mexico, an important region that has been little studied by relatively few archaeologists to date. Over more than 25 years, along with our colleagues and many students, our archaeological investigations have included a reanalysis of the funerary mound at Guasave, Sinaloa and an evaluation of the relationship between Mesoamerica and Northwestern Mexico, the Pleistocene people of Sonora and Mexico, the Early Agricultural period at La Playa (SON F:10:3) and other sites, paleoethnobotanical studies and environmental reconstruction in several sites in Sonora, regional systematic survey of the Río Fuerte Valley in Sinaloa, the long-distance exchange routes linking West Mexico with northwest Mexico and the American Southwest, research at the exceptional Fin del Mundo Clovis site and 12,000 years of human adaptations and the climatic changes in the Sonoran Desert. Most recently, we have begun research in the Sahuaripa region of eastern Sonora in order to investigate both the long-distance and regional interaction spheres and socio-politico-economic organization of the Río Sonora and Serrana archaeological traditions. We believe that this research effectively expresses the depth and breadth of Paul and Suzy's multifaceted archaeological perspectives.

Carpenter, Lacey (University of Michigan)

[278] Residential Variability and Change through Time at San Martín Tilcajete

Social evolutionary transformation involves and affects all levels of human society, including households. The formation of a state-level society at the Tilcajete sites has been documented through extensive horizontal excavations focused on the civic-ceremonial buildings at a two Formative Period sites in the southern branch of the Oaxaca Valley. This paper presents findings from two seasons of work in 2014 and 2016 focused on the residential sectors at El Mogote, occupied during the Early Monte Albán I phase (500–300 BC) and El Palenque, occupied during the Late Monte Albán I phase (300–100 BC). I examine residential variability within each site as well as change through time. I argue that the timing and nature of changes to residential architecture, activities, and assemblages reflect the dynamic role household decisions played in the sociopolitical transformations at the sites.

[278] Chair

Carpenter, Michelle (Idaho State University)**[260] An Analysis of the Jamestown Diet**

Our current knowledge of the historic fort of Jamestown in Virginia has developed through interpretation of the archaeological record and historical documents. The success of all colonies in the New World depended on the integral ability to produce food. Prior to developing a stable food source, the colonists at Jamestown relied heavily on those provisions they brought with them from England. We can learn about these provisions from ship manifests, colonists' diaries, and inventory lists. Careful examination of the faunal remains found at Jamestown can potentially reveal new information that is not based on misleading historical documents. This presentation hopes to show that the diet of the colonists during the winter of 1609/1610 was altered drastically by an acute lack of food. This idea will be supported by analysis of faunal remains discarded in wells located throughout the island. These wells date as far back as 1607 until a period when the fort was more stable in food production in 1612. Stable isotope analysis of these faunal remains will reveal which were provisions the colonists brought with them from England and which were raised in the New World.

Carpiaux, Natalie (University of Wisconsin—Milwaukee)**[102] Oneota Household Dynamics at the Koshkonong Creek Village**

Despite a long history of research into the Late Prehistory of the Upper Great Lakes, insufficient attention has been paid to the nature of early Oneota households. Little is known about their size or composition, nor the nature or degree of interaction between and among them. Contemporaneous houses of different sizes and styles have been noted together at Oneota sites in the southeastern Wisconsin, further emphasizing the need for a greater understanding of Oneota household dynamics. This study begins to explore some of these issues, through a feature-level stylistic analysis of ceramics from one Oneota site. The Koshkonong Creek Village (47JE379), or KCV, is a large Oneota habitation in southeastern Wisconsin. Three field seasons have revealed densely packed, overlapping features at this site, representing continual occupation dating from approximately AD 1000–1400. At least two separate house structures have been identified; a long house and wigwam style dwelling. The pattern duplicates household forms seen at other sites in the area. The numerous ceramics from the Koshkonong Creek Village site show a variety of design elements, some unique to the Koshkonong region or even the site itself. A household approach is applied to the ceramics to investigate household organization at the site.

Carpio, Margaret (MOCHE, Inc.), Patrick Mullins (University of Pittsburgh and MOCHE, Inc.), Brian Billman (UNC-Chapel Hill and MOCHE, Inc.) and Rachael Lew (MOCHE, Inc.)**[230] Movement and Vision: Reconstruction and Analysis of a Multi-Occupation Fortified Site Complex in the Moche Valley**

This poster reports the results of noninvasive field prospection using aerial drone photogrammetry to map and reconstruct surface architecture at two multi-occupation archaeological sites in the Moche Valley of Peru. Sites MV-42 and MV-49 (Puente Serrano) make up a fortified and possibly ceremonial center complex located in the middle valley. The sites were occupied contiguously during the Salinar, Gallinazo, and Early Moche phases (EIP; 400 BC–AD 400), with a later reoccupation by the Chimú phase (LIP; AD 1000–1470). Aerial drone maps were imported into GIS software to allow for more robust analyses working toward interpreting and analyzing human movement while ascending to the summit. These data will help us to better assess the importance of vision in settlement location and protective architectural positioning using view sheds and inter-visibility analyses with the surrounding landscape.

Carr, Sean (Penn State University) and Alma Gabriela López Rivera (Tula Region Interaction and Migration Project [TRIMP])**[120] Technological and Archaeometric Analysis of Obsidian from Cerro Magoni**

This study addresses one of the fundamental goals of the TRIMP—to contextualize local processes with broader patterns on regional scales—by combining formal technological and geochemical source analysis of obsidian recovered from recent archaeological excavations at Cerro Magoni, a hilltop Epiclassic site in Tula, Hidalgo. Archaeologists can use a variety of archaeometric techniques to better understand ancient interaction networks. Obsidian is a chemically homogeneous volcanic glass that was widely traded in Mesoamerica throughout the prehispanic era. This valuable resource was procured at geographically specific source areas, each of which has a unique chemical signature. Portable X-ray fluorescence (pXRF) permits archaeologists to detect the unique trace-element signature of obsidian artifacts with a high degree of certainty. With this information, the original source of each obsidian artifact can be determined. This paper presents a preliminary appreciation of patterns in local lithic production and regional exchange networks through the combined results of 1) formal technological analysis of the obsidian assemblage from Magoni, and 2) pXRF source analysis of a sample of the assemblage to provide additional insight into the social and economic networks that operated during the Epiclassic period in the Tula region and beyond.

Carr, Christopher (University of Cincinnati), Jeffrey Brewer (University of Cincinnati), Nicholas Dunning (University of Cincinnati), Kathryn Reese-Taylor (University of Calgary) and Armando Anaya Hernández (La Universidad Autónoma de Campeche)**[337] Using Lidar to Locate and Classify Ancient Maya Water Storage Features at Yaxnohcah, Campeche, Mexico**

Airborne lidar presents a valuable tool to investigate water management in a water-scarce region of the Maya lowlands. We analyze 25 km² of lidar elevation data for the ancient Maya site of Yaxnohcah in Campeche, Mexico. Using the hydrologic tools in the GIS software ArcMap we identified hundreds of closed depressions (many extremely small). These features may have a natural origin (e.g., a sinkhole) or may be anthropogenic (e.g., from quarrying), or may be data artifacts. We used a series of filters to narrow the list of closed depressions to those which have the potential to be used for water storage. We examined many of these features on the ground and excavated several, with the archaeological data indicating their origins during the Middle Preclassic period (900–400 BC). As the lidar also shows residential and monumental structures, we examine the spatial relationships between structures and water storage features (including watershed area, drainage lines, and water storage capacity).

Carr, Christopher [337] see Dunning, Nicholas

Carr, Philip (University of South Alabama)**[193] Representing and Intervening: Team-Based Learning in AN 442 Cultural Resource Management**

Team-Based Learning (TBL), a powerful pedagogical tool, has several essential elements: forming permanent teams; flipping the classroom; following a specific sequence of individual work and teamwork, and providing immediate feedback. In combination, these elements create a motivational framework in which students increasingly hold each other accountable for coming to class prepared and contributing to solving meaningful problems in various manners. Creating in-class application activities as part of the flipped classroom strategy is an essential element and can be daunting for first-time adopters of TBL because of the upfront commitment to their creation. Employing the thought process "representing and intervening" from philosophy provides a strategy for constructing these activities by which students are provided the "textbook" view of a topic outside of class (representing) and are given the meaningful and "messy" real world (intervening) activities in class. By working through the activity, students clarify and deepen their understanding of the textbook view and hone their experience with significant problems. TBL holds great promise for undergraduate students in the classroom acquiring a deep knowledge and an enduring understanding of archaeological method, theory, and practice.

Carriere, Ed [138] see Croes, Dale

Carrillo Bosch, Vania (Dirección de Registro Público de Monumentos y Zonas Arqueológicas e Históricos)

[328] *Protection of Cultural Heritage: The Case of Yaxcabá and Yaxunah, Yucatán*

The objective of the paper is to present and compare the notions held by the contemporary residents of the town of Yaxcabá, the municipality's head, and the village of Yaxunah in Central Yucatán, about the protection and conservation of the archaeological sites on their lands. Even though Yaxcabá and Yaxunah are less than 20 km apart, these two population centers display social, political, and economic differences and have been influenced by varying amounts of exposure to archaeological research projects and tourism. As a result the notions of cultural heritage vary among the inhabitants of Yaxcabá and Yaxunah. We will also provide recommendations for how to integrate local residents' full participation in promoting the protection and conservation of cultural heritage. Archaeologists need to be fully aware of the different land tenure and management systems of the lands onto which archaeological sites are located, as these will affect the way communities relate and engage with the ruins. Close collaboration of archaeologists and local communities are essential for a successful cultural heritage conservation and management process.

[328] *Chair*

Carriosa Montfort, Fernando [225] see De Anda Rogel, Michelle Marlene

Carroll, Jon (Oakland University)

[350] *Using Aerial Remote Sensing to Assess Error and Uncertainty in Archaeological Site Mapping*

Archaeologists often find themselves excavating sites where previous investigations have been performed, and documentation relating to earlier work may be of varying quality. This discussion focuses on the use of a topographic mapping drone to assess error and uncertainty in archaeological site survey performed at Tel Lachish, Israel since the 1930s. Systematic assessments of historical map datasets were performed within a Geographic Information System (GIS) allowing for an enhanced understanding of site excavation over time. These assessments allow researchers to avoid previously disturbed areas with a much greater degree of confidence maximizing valuable field time.

Carson, Mike (Micronesian Area Research Center [MARC])

[208] *Changing landscapes of the Paleolithic/Neolithic transition in Taiwan*

Toward understanding the Paleolithic/Neolithic transition in Taiwan, a paleo-terrain approach allows reconstruction of the ancient landforms and habitats of where people lived. Those ancient contexts help for us to situate the activities of people using their landscapes in different ways at intervals of 7,000, 6,000, 5,000, and 4,000 years ago. This approach needs to account for significant change in tectonic movement of land masses, slope erosion and redeposition patterns, fluctuating sea level, and other factors coordinated with the geographic distribution of cultural sites at specific measured time periods. By building a stronger sense of the natural and cultural context during the time period of study, other questions can be explored more productively.

[110] *Moderator*

[253] *Discussant*

Cartagena, Isabel [134] see Gayo, Eugenia M.

Cartagena, Isabel [134] see Loyola, Rodrigo

Carter, Alison K. (University of Illinois Urbana-Champaign)

[333] *Houses (and Gardens?) at Angkor*

Household archaeology and a focus on residential spaces is an emerging field in Southeast Asia. At Angkor, this approach has great potential for exploring the resiliency of nonelite members of society through changes in environmental and sociopolitical processes. In this paper we present results from the ongoing analyses of a 2015 excavation of a house mound within the Angkor Wat enclosure. Using a variety of techniques including macro- and microbotanical analyses, geoarchaeology, soil chemistry, and spatial analyses of artifacts we aim to identify specific activity areas on top of the mound. Botanical analyses are especially informative for identifying the presence of household gardens and subsistence practices of the people on the mounds. Radiocarbon dates suggest a continuous occupation of the mound during the Angkorian period, with reoccupation or reuse during the post-Angkorian period. Although issues of preservation and the nature of Angkorian house construction (which built houses on stilts with their house floors above the ground) are challenging, we see great potential in this research.

[271] *Chair*

Carter, Benjamin (Muhlenberg College)

[372] *Discussant*

Carter, Kari, Aubrey Cannon (Department of Anthropology, McMaster University) and Eduard Reinhardt (School of Geography and Earth Sciences, McMaster U)

[22] *ITRAX XRF Analysis of Shell Midden Sediments from Sites on the Central Coast of British Columbia*

We present the results of using an ITRAX XRF core scanner on fine-fraction shell midden sediments. High-resolution multi-element analyses of central coast sites confirm patterned intra- and intersite variability in the relative abundance of phosphorus and calcium determined on the basis of earlier low-

resolution studies. Analysis of Namu site deposits dating from 11,000–2000 cal BP show the relative absence of residual calcium in early shell-free deposits (ca. 11,000–7000 cal BP) but overall continuity in the relative abundance of potassium throughout the deposits. We outline preliminary interpretations of these results, and the further potential for the application of this method on the Pacific Northwest Coast and at shell midden sites globally. The precision and replicability of this technique, and its capacity to produce reliable results from very small quantities of material, support wider use of small-scale sampling of shell midden sites combined with intensive analysis of midden constituents.

Carter, Michael (Director, Industry Relations, Master in Digital Media), Jean Li (Department of History, Ryerson University) and Alex Ferworn (Department of Computer Science, Ryerson University)

[18] *Looting, Robotics, and Experiential Archaeology for Non-Archaeologists*

This paper will examine a recent effort to develop an interdisciplinary graduate level digital media and physical computing course, framed as experiential archaeology for non-archaeologists. By combining theory and practice of digital media, archaeology and a computer science course in robotics as an introduction to the cultural heritage destruction of the el-Hibeh site in southern Egypt due to pervasive looting, graduate students in digital media worked alongside undergraduate students in computer science to design, develop and “deploy” functional robots that could be hypothetically used to examine the extent of looting holes and tunnels within a simulated archaeological landscape. Egyptologist and co-Director of the el-Hibeh site, Dr. Jean Li framed the archaeological, historical and current best practices of Egyptian archaeology while Dr. Alex Ferworn, a specialist in disaster management robotics design, provided the practical technical knowledge to address design, functionality and applicability in the field. This interdisciplinary approach demonstrated how non-archaeological students from varied fields of expertise and skill, could negotiate archaeology, digital media and physical computing in the creation of new archaeological knowledge in methods and practice. In doing so, archaeology and the application of digital media became the basis of their experiential learning.

Carter, Tristan (McMaster University), Zachary Batist (University of Toronto), Kathryn Campeau (University of Toronto), Yosef Garfinkel (Hebrew University) and Danny Rosenberg (University of Haifa)

[22] *Social Interaction at Distance over the Long Term: Obsidian Sourcing from the Southern Levant (Ninth–Fourth Millennia cal BC)*

The McMaster Archaeological XRF Lab is dedicated to undertaking major regional obsidian sourcing studies, not least in the Eastern Mediterranean where we have the North American geological source sample collection. We take a holistic, integrated approach, melding chemical composition with the artifacts’ techno-typological characteristics, contextual information and other pertinent data to produce “thick description” narratives. In this case we consider obsidian circulation and consumption among Southern Levantine populations over five millennia, from Pre-Pottery Neolithic B to the Early Bronze Age (ninth–fourth cal millennia BC). Artifacts were analyzed using EDXRF spectrometry from Nahala Lavan 109, Beisamoun, Sha’ar Hagolan, Ein el Jarba, Tell Tsaf, Tell Ali and Marj Rabba. Sourcing data is then located within a broader Levantine, South-East Anatolian and Mesopotamian context using Social Network Analysis. The results show that while the relative quantities of these exotic products (closest sources >800 km distant) in circulation did not change significantly, the range of raw materials increased significantly through time, from an initial reliance on central Anatolian products, to the use of central, eastern and north-eastern Anatolian and Armenian obsidian. The expanded socioeconomic networks that underpinned these Southern Levantine communities’ access to obsidian are interrogated with regard to larger cultural dynamics of these periods.

Carter, Tristan [22] see Campeau, Kathryn

Carvajal Contreras, Diana

[270] *Rethinking the Formative Stage: A Reconsideration from Two Archaeological Sites on the Colombian Caribbean Lowlands*

The concept of formative in Colombia is traditionally framed as a transitional period within the unilineal cultural evolution in the Americas, characterized for several indicators such as sedentary life, diversity of socioeconomic forms and the emergence of new technologies such as pottery. In this paper, we revised two archaeological sites: Monsu and Puerto Hormiga, incorporating zooarchaeological analysis, technological and use-wear analyses to provide understanding into past human behavior including interaction with tropical environments, changes in subsistence, seasonality, mobility and adaptation. With this understanding, we discuss the scope of the concepts developed around the formative stage for the comprehension of early human adaptations in the Caribbean Lowlands.

[220] *Discussant*

Carvalho, António Faustino [23] see Rodriguez-Rellan, Carlos

Carvalho, Milena (University of Louisville)

[165] *An Assessment of Small Game Exploitation at Gruta Nova da Columbeira in the Middle Paleolithic (Portugal)*

In Europe, differences in subsistence between Neanderthals and anatomically modern humans are one of the ways in which archaeologists detect behavioral shifts in the Middle to Upper Paleolithic transition. In this paper, I present faunal and stable isotopic analyses of *Oryctolagus cuniculus* (the European wild rabbit) from levels C.6, C.7, C.8, and C.9 of Gruta Nova da Columbeira, a Mousterian cave site located in central Portugal. I use these data to test two subsistence models: 1. Anatomically modern humans gained a competitive advantage over Neanderthals by exploiting broad-spectrum diet type prey items such as the rabbit (as in Fa et al. 2013); and 2. Neanderthals practiced a broad-spectrum diet in local environments exemplified by sites such as Bolomor Cave (as in Blasco and Peris 2012). To conclude, I explore whether central Portugal displays the same shift in subsistence patterns from the Middle to Upper Paleolithic transition as elsewhere in Europe and if using the concept of a transition is an efficient way to track human adaptation to environmental change in the Pleistocene.

Casana, Jesse (Dartmouth College)

[29] *A Hot New Technology: Advancing Methodologies for Archaeological Aerial Thermography*

Since the 1970s, archaeologists have known that a wide range of features, including subsurface architecture, pits and ditches, pathways, and surface artifacts should theoretically be visible in an aerial thermal image, but technological hurdles largely prevented thermography from being deployed in most field settings. Recent research has begun to take advantage of new lightweight, uncooled thermal cameras, increasingly reliable drones, and photogrammetric image processing software, revolutionizing archaeologists’ ability to collect and mosaic thermal imagery. Utilizing data from archaeological sites in North America and the Middle East, this paper presents new methods for acquisition and processing of aerial thermal imagery using a camera system that collects raw thermal imagery at very high spectral resolution. These data offer many possibilities for quantitative, raster-based methods to filter out noise, improve feature recognition, and perform archaeological feature discrimination. Results reveal a great deal regarding the varied archaeological sites investigated by this project, in many cases rivaling results of more conventional archaeo-geophysical data, and thereby offering researchers a powerful new method to explore the archaeological record in a way that is rapid, inexpensive, and nondestructive.

Casanova Vasquez, Erick (Universidad Nacional Mayor de San Marcos), Abigail Gamble, Beau Murphy (University of New Mexico), Karissa Dieter and Steven A. Wernke (Vanderbilt University)

[75] *Houses of Colonial Chiefly Authority: Local Elites in the Social Order of Mawchu Llacta, a Colonial Reducción Town in the Southern Highlands of Peru*

As a result of the Toledan Reforms in the Viceroyalty of Peru during the late fifteenth century, new settlements known as reducciones were established to centralize indigenous populations. Such is the case of Mawchu Llacta, originally Espinar de Tute, in the Caylloma Province, Arequipa. The introduction of these sweeping reforms brought a series of major changes to the social order. External agents were established as the new bearers of power and local elites took on a secondary status. However, a dearth of archaeological data limits our understanding of the social and political character of local elites in reducciones. Excavations by the PATA project during the 2016 season inside three structures that are the likely dwellings of curacas allow us to learn more about the role played by these local authorities within their community. Initial evidence suggests that these houses served a semi-public role as gathering spaces for religious festivals and community events, though diversity in the lifeways of the three elite households is also clearly displayed. The comparative analysis of the architectural elements and cultural materials provide us with enough information to better define the principal activities of local elites and how they participated in a new colonial social order.

Casanova Vasquez, Erick [75] see Berquist, Stephen

Casar, Isabel (Instituto de Fisica UNAM), Pedro Morales (Instituto de Geologia Universidad Nacional Autonom), Ernesto Velasco (Centro INAH Tamaulipas) and Abigail Meza (Instituto de Investigaciones Antropologicas Univer)

[290] *Reconstruction of Diet and Mobility Patterns in Human Remains, Bone, and Teeth from a Mortuary Cave (Cueva De La Sepultura) in Tamaulipas, Northeastern Mexico, through Stable Isotope Analysis*

Bone and teeth were analyzed from multiple burials from a mortuary cave in the North of Mexico, dated around 1400 and 400 BC. Samples from 14 jawbones were analyzed to obtain the $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ of the bone collagen as well as $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ in bone bioapatite; M2 or M3 from the jawbones were cut into a series of layers to obtain multiple isotopic signatures from enamel, structural carbonate and collagen from the dentine of each tooth, representing different periods in the life of the individual. $\delta^{13}\text{C}$ of both dietary components shows a heavy reliance on C4 and CAM resources and probably maize with seasonal variations. Unusually high $\delta^{15}\text{N}$ may represent high levels of hunting activity as well as high $\delta^{15}\text{N}$ from ^{15}N enriched soils or CAM plants. The isotopic analysis supports the possibility of a mixed economy for the individuals from the mortuary cave with changes in diet related to hunting, fishing, recollecting local wild plants, as well as adopting low intensity agriculture of domesticated plants to different degrees.

Cascalheira, João (ICArEHB—Portugal), Nuno Bicho (ICArEHB—Portugal) and Celia Goncalves (ICArEHB—Portugal)

[154] *An Android-Based System for Archaeological Survey and On-Site Stone Tool Analysis*

A recent survey project is documenting new Stone Age sites in various regions of Mozambique, including the areas of Niassa in the north and Limpopo in the south. Most of this work involves the identification and characterization of hundreds of surface lithic scatters among which thousands of stone tools must be analyzed. A digital recording system was required that would allow to 1) register information of each scatter, including context description and geographical coordinates; 2) do on-site lithic analysis using custom data entry forms and allowing direct input from digital calipers; and 3) rapidly organize, visualize, and share survey data between survey teams at a daily basis. This poster displays the application of a freeware Android-based system, composed of two self-authored smartphone apps with fully customizable configurations and thus usable by other researchers. The apps use the built-in GPS chips and direct mini-USB (OTG) input capabilities of smartphones to, respectively, get sites' coordinates and gathered lithic measurements data from digital calipers. The system also allows to easily export site and lithics data into Google Fusion Tables cloud-based service, where team members can visualize and manage data, including photographs of each scatter or stone tool, and create custom maps.

Cascalheira, João [154] see Goncalves, Celia

Casella, Melissa [194] see Sparks, Shane

Case, Nicholas (San Diego State University), Julia Clark (American Center for Mongolian Studies), Tumurbaatar Tuvshinjargal (National Museum of Mongolia) and William Taylor (University of New Mexico)

[114] *Photogrammetry, Provenance, and Preservation of Tangible Heritage in the Khangai Mountains, Mongolia*

This study presents results from the photogrammetric documentation of rock art in western Mongolia. Unlike many traditional rock art documentation techniques practiced in Mongolia, photogrammetry presents unique advantages for the study and preservation of cultural heritage. These include the production of a digital 3D model, preservation of color and original lighting conditions, ease of documentation, and the inclusion of contextual information such as surrounding features, panel orientation, and geologic context. Using photogrammetric techniques, we documented 10 late Bronze Age standing stones and three separate rock art localities in the Khangai mountains of Bayankhongor province, western Mongolia. By taking images at different times of day, we were able to produce high-visibility images of "deer stone" stelae, obviating the need for chalk or other substances which can damage the stone surface. By integrating our data with aerial photography, we produced high-resolution digital maps of our study sites. Results suggest that 3D photogrammetry may be profitably integrated into future research of late Bronze Age monuments in Central Asia.

Case, Emily and Emma Britton (UC Santa Cruz)

[155] *Compositional and Lead Isotope Analyses of Carretas and Huerigos Polychrome from Northwestern Chihuahua*

The northern Mexican state of Chihuahua contains many little-known archaeological sites. Established collections, such as E. B. Sayles's 1933 survey collection, can provide new insights using analytic techniques not available when they were originally acquired. We analyzed a subset of Sayles's collection, including Carretas and Huérigos polychrome ceramic types, for glaze compositional information and geographic sourcing of the lead flux. Analyzing the samples using laser ablation inductively coupled mass spectrometry (LA-ICP-MS) determined new compositional information. Isotopic analysis using acid dissolution ICP-MS and subsequent comparison with previously analyzed samples from lead ore mines in the Chihuahua area contributed to geographic sourcing of the lead component. Chemical characterization suggests that both Carretas and Huérigos polychromes used similar, consistent and effective glaze recipes in their creation. Lead isotope ratios suggest pottery creators likely procured ore for glaze-paint production from mines in northern Chihuahua. However, lack of comparative isotopic data from the immediate area around sampled sites means the comparisons and conclusions presented here are preliminary.

Caseldine, Christopher (Arizona State University)

[335] *New but Classic: An Examination of Hohokam Canal System 1 during the Classic Period*

Canal System 1, the largest of the four major systems along the lower Salt River, brought water to fields associated with some of the most well-known Hohokam villages, including Mesa Grande, Los Hornos, and Los Muertos. Previously, it was thought that the system reached its maximum extent prior to the Sedentary Period. Recent data and reconstructions of the development of Canal System 1, however, indicate that the system may not have reached its full extent until the Preclassic/Classic transition or the early Classic. If so, the expansion of the system would represent the final major irrigation construction with the lower Salt River Valley. In this paper, I examine Canal System 1 during the Classic. I suggest that sociopolitical changes, which occurred within the system during the late Preclassic and early Classic, led to a fundamental reorganization of the system that may have reverberated throughout the valley.

[335] Chair

Caseldine, Christopher [335] see Howard, Jerry

Cases, Bárbara [134] see Valenzuela, Daniela

Casey, Joanna**[161] *From the Field to the Festival: Reading the Landscape of Cloth in Axum, Ethiopia***

The city of Axum in northern Ethiopia is well-known for its high quality, hand woven cloth. Sundays and festivals bring throngs of local people who, to the outside observer, appear to be uniformly dressed in beautiful white handspun clothing embellished with colorful woven borders and embroidery. This apparent uniformity belies a very complex set of activities that lead to the production, distribution and consumption of cloth in Axum. Each step in production is dominated by people of particular ages, genders, economic levels, religions and ethnicities, who work entirely independently in different parts of town and have complete autonomy over the products of their labor, but usually very little interest in the finished product. Consumption is a matter of taste, tradition and finances. In the town shops lure wealthy customers with new embroidery styles named for current events, while village women enhance inexpensive industrially produced cloths that develop a parallel conversation about feminine craft in rural households. The purpose of this paper is to chart the landscape of cloth in Axum through production, trade and consumption and to challenge the perception that the production of cloth resides in the moment of weaving and in the skills of the master weaver.

Cassedy, Daniel (AECOM)**[260] *Archaeology of British Military Logistics in the French and Indian War***

The Hudson River in upstate New York formed a strategic military corridor between the North American British and French colonies for centuries. In the 1750s, it was the setting for multiple British expeditions moving north to contest the French coming south out of Lake Champlain and Canada. Because the fighting was seasonal, as were the garrisons of the forts and storage depots, the facilities had to be frequently rebuilt, and the entire supply chain had to be renewed annually to move tons of food and weapons by bateaux and ox cart to the front lines. Primary historic documents combined with data from excavations at multiple sites along the river between Albany and Lake Champlain have provided evidence to help re-create and understand this complex logistical supply chain and better illuminate the daily lives and experiences of eighteenth-century soldiers.

Cassen, Serge (CNRS), Pierre Pétrequin (CNRS), Guirec Querré (Ministère de la Culture) and Valentin Grimaud (Université de Nantes)**[23] *Spaces and Signs of Transfer of Jade and Callais in the Neolithic of Western Europe***

Two different groups of green stones with a distant origin are found together in the Neolithic tombs of the Carnac Region (Brittany, France): the Alpine jades (jadeite, omphacite, eclogite) were used as raw material for polished axes and disc-rings, while the Iberian callais (variscite, turquoise) for pendants and beads. The way in which these transfers took place will be the subject of this presentation, highlighting the specific features of each geographical area. With such aim in mind, the rows of steles and the iconographic programs inscribed in the standing stones of the study area will be analyzed in order to propose a comparison of the respective symbolic systems. If the land routes from the Alps begin to be better monitored during the fifth millennium, the sea routes to/from the Iberian Peninsula remain theoretical but very promising. We will offer several arguments in favor of the latter hypothesis.

[23] Discussant

Cassen, Serge [23] see Querré, Guirec

Casson, Aksel (Slippery Rock University)**[43] *Developing Long-Term Public Archaeology in Slippery Rock, Pennsylvania***

Slippery Rock University (SRU) maintains the historic Old Stone House as a museum in Slippery Rock, Pennsylvania (Butler County). In addition to living history and educational events held on site, an active archaeological excavation is being conducted on an external structure, hypothesized to be a summer kitchen. Preliminary excavations have been a joint venture between SRU students and faculty and members of the local community—including amateur archaeologists. This presentation will discuss efforts to develop long-term integrated public archaeology using the Old Stone House and the new SRU Archaeology Lab to foster engaged community stewardship and interest in cultural heritage management among town and gown alike.

Castañeda, Amanda M. (Texas State University- San Marcos)**[126] *Characterizing Hunter-Gatherer Ground Stone Bedrock Features in the Northeastern Chihuahuan Desert***

Ground stone bedrock features are common at archaeological sites in the Lower Pecos Canyonlands of southwest Texas. These features are human-made depressions pecked, ground, or worn into bedrock or large boulders, and were used for a variety of processing activities by the indigenous peoples. Although archaeologists in the region have informally recognized different “types” of ground stone bedrock features (e.g., slicks, grinding facets, deep mortars), there have been no dedicated studies of bedrock features. Due to their widespread occurrence in the region, bedrock features represent an untapped research avenue regarding the lifeways of Lower Pecos hunter-gatherers. Therefore, to gain a better understanding of these features, 824 bedrock features were mapped, documented, and analyzed at ten sites across the Lower Pecos. Structure from Motion (SfM) photogrammetry was utilized to map the bedrock features and provide high resolution three-dimensional data to gather metric measurements. Statistical analyses were employed to characterize the range of bedrock feature variation. This paper discusses the potential implications of bedrock feature morphological variation and explores the role(s) these features played in Lower Pecos hunter-gatherer lifeways.

Castañeda, Amanda M. [126] see Hanselka, Kevin

Castanet, Cyril [131] see Nondédéo, Philippe

Castañón, Mijaely (Instituto Nacional de Antropología e Historia), Lissandra Gonzalez (INAH-Michoacán), Alejandro Valdes (INAH-Michoacán) and José Luis Punzo (INAH-Michoacán)

[12] *Characterization of Ceramics Uncovered in the Parota River Basin and Lake Sirahuen Basin, Michoacán, Mexico: Fluorescence Analysis in Ultraviolet Light and Petrography in Thin Sheets*

This poster shows the results of the petrographic characterization of the ceramics found in the basins of the Parota River and Lake Sirahuen, two archaeological areas surveyed as part of the Proyecto Arqueología y Paisaje del Área Centro Sur de Michoacán. Fluorescence techniques applied are an induction of ultraviolet light and petrographic analysis in thin sheets; the first technique was used as an experimental test to identify variances in a very large sample and thereby to reduce to a viable quantity for lamination. Petrography into thin sheets yielded information on mineralogical composition, manufacturing techniques, and data used to propose a first approach in identifying regions for raw material extraction.

Castañón, Mijaely [12] see Gonzalez, Lissandra

Castañón, Mijaely [12] see Valdes, Alejandro

Castellanos, Jeanette [125] see Foias, Antonia

Castelli, Clotilde [62] see Horta, Helena

Castells Navarro, Laura [139] see Armit, Ian

Castillo, Cristina (Institute of Archaeology [UCL])

[177] *Cereals in Southeast Asian Prehistory*

Rice is the most important crop in Southeast Asia today. The evidence is that rice was equally important in Southeast Asia's past. From the Neolithic period to the Middle Ages, rice has been discussed as food, a ritual item, a farming system, a culinary tradition, a tradable commodity and the basis of power. However, was it always the staple crop in Southeast Asia? The archaeobotanical studies conducted in Central Thailand by Weber revealed that in some instances and places, millet was more important than rice. In this paper, we discuss cereals and their role in Southeast Asia. Sites belonging to different periods in Mainland Southeast Asia are presented with information derived from the study of plant remains, including cereals and weeds of cultivation.

Castillo, Feren [170] see Uceda, Santiago

Castillo, Mario (University of California, Berkeley) and Patricia Fournier (Esquela Nacional de Antropología e Historia)

[84] *Settlement Ecology in the Tula Region of Mesoamerica: A Local Landscape Perspective*

Based on seminal contributions by Suzy and Paul Fish associated with full-coverage surveys and agave cultivation, this paper explores changes in regional settlement patterns in relation to land-surface morphology in the Tula region in Mesoamerica during the Classic to Postclassic periods (200 CE–1500 CE). Drawing on our field surveys, independent settlement data from the Tula Region, and landform segmentation and classification in Geographic Information Systems (GIS), this paper illustrates that place to place landscape variation provides a more complex picture of changes in regional settlement patterns over time. In addition, to interpret the landscape ecology of settlement patterns, geomorphometric analysis provides an additional tool for assessing potential taphonomic impact on archaeological remains. In this paper we provide preliminary results and discuss how integration of other spatial datasets can provide a more robust framework from interpretation of settlement changes in relation to Mesoamerican's local landscape ecologies in central Mexico.

Castillo Butters, Luis (Universidad Católica del Perú) and Aldo Watanabe (Ministerio de Cultura, Perú)

[29] *Drones, Photogrammetry and 3D Modeling in Peruvian Archaeology*

Air photography, using Drones and 2D/3D Models produced with Photogrammetry, is changing the way we do field archaeology. This technology also can be a powerful tool in telling a story about the sites and the work that we, as archaeologists, do there. However, several technological adaptations have to be developed in order to take full advantage of these new technologies. In this paper, we will walk you through the process of combining air and ground based 3D modeling along the North Coast of Peru, which utilizes air photography technology to produce a new way to render our visions of the past.

[170] *Discussant*

Castillo-Cardenas, Karime (UCLA)

[36] *Technology Transfer, Variability, and Adaptation of Glass Production in Colonial Mexico: Preliminary Results from a Local and Global Perspective*

Glass arrived in the Americas as a fully developed technology and glass workshops appeared in New Spain soon after the establishment of the colonial regime. Little is known about the way this technology was adapted to the local resources and conditions, the variety of products made, and how this technology changed and assimilated within the viceregal world and the Spanish Empire at large. Through a multi-scalar and multidisciplinary approach incorporating archaeology, history, ethnography and scientific investigations, this project unfolds the social changes and the processes of adoption of glass technology in colonial Mexico within the context of the local sociopolitical milieu and global influences that shaped its development. Historical research performed at national and local archives in Mexico and Spain, combined with ethnographic research and the scientific study of glass artifacts, have provided crucial information on the social and technical aspects of glassmaking and glassworking in New Spain, thus placing Mexican archaeological glass collections in a global context.

Castro, Silvina (CONICET, Laboratorio de Paleoecología Humana, Universidad Nacional de Cuyo), Gustavo Lucero (Laboratorio de Paleoecología Humana, Universidad), Valeria Cortegoso (CONICET, Laboratorio de Paleoecología Humana, Univ) and Marsh Eric (CONICET, Laboratorio de Paleoecología Humana, Univ)

[91] *Costs of Acquiring Lithic Materials in High Altitude Environments (Northwestern San Juan Province, Argentina): A GIS-Based Evaluation*
Based on geo-archaeological studies on the Argentine–Chilean border in the southern Andes, a method is proposed for ranking lithic sources based on the quality of the material, cost of accessibility, and location along travel corridors. In the upper Las Taguas river valley (northwestern San Juan Province, Argentina, 5500–3700 masl), 32,622 lithic artifacts from 30 sites were analyzed to study the variation in the use of seven lithic sources between 10,000 and 500 cal BP. We ranked the time required to travel from each site to all sources with anisotropic analysis based a surface elevation model and Tobler's cost for movement on slopes. Considering Andean topography the accessibility of each source is ranked in terms of its distance to travel corridors and movement based on least cost path calculations. Finally, based on detailed analyses of archaeological material and regional models, we propose distances that may help to estimate lithic sources as nonlocal or extra-regional.

Castro, Victoria [134] see Valenzuela, Daniela

Castro Irineo, Jacqueline [225] see Chávez Balderas, Ximena M.

Catanach, Samuel (Arizona State University) and Mark R. Agostini (Brown University)

[34] *Relational Native Ontology and Tewa Ethnogenesis in the Pueblo of Pojoaque*
This paper recognizes the collaborative potential between American Indian Studies and an emerging landscape archaeology in furthering interdisciplinary studies of the American Southwest. Here the authors call for the continued reinterpretation of ancestral and contemporary Tewa sites by employing Native ontological and decolonized historical approaches to archaeological and ethnographic contexts situated in the backdrop of a larger and active cultural landscape. Such methods offer nuanced insight into the functions and meanings relating to multiple interacting identity communities through time, population movements, and other types of migration. In particular, we discuss the effects of early Spanish colonialism and later American colonialism, mass migrations, indigenous language, and the potential relationship between archaeological inquiry and Pueblo people in what is now the modern day Pueblo of Pojoaque.

Cattáneo, Roxana [226] see Flegenheimer, Nora

Cattáneo, Roxana [227] see Izeta, Andres

Cau Ontiveros, Miguel Ángel (ICREA and University of Barcelona)

[166] *Discussant*

Cau Ontiveros, Miguel Ángel [166] see Mas Florit, Catalina

Cauchois, Hinanui (University of Hawaii at Manoa) and John O'Connor (University of Oregon)

[302] *Preliminary Investigations at Raiatea, Society Islands, French Polynesia*
The Society Islands are of primary importance for understanding human impacts on island ecologies and the dispersal of precontact voyaging populations in East Polynesia. Raiatea, the largest island of the Leeward Group, is recognized through Polynesian oral traditions as a locus of regional interaction and a departure point for migrations that colonized the distant islands of Hawaii and Aotearoa (New Zealand) in the second millennium AD. Here we present results from our first season of fieldwork in the district of Tumaraa, western Raiatea. Subsurface testing has provided a stratigraphic profile for coastal flats and offshore islets (motu). Excavations at the megalithic Marae Tainuu revealed evidence of a substantial occupation history, with the exposure of early architecture, a dense deposit of subsistence remains, and evidence for the manufacture and use of lithic tools. Long-term project goals include a detailed analysis of the historical ecology of Tumaraa from which to situate this region in the broader context of East Polynesian settlement history and examine the impacts of human activity on coastal and offshore environments.

Cegielski, Wendy (Arizona State University)

[234] *Chronology and Social Process in Bronze Age Spain*

This research presents an evaluation of the use of morphometrics of ceramic vessels for organizing site chronologies and social interaction. The object of morphometric analysis is to study how changes in artifact shape covary with time and space. This particular method is tested against Bronze Age ceramics from the Valencian region in Spain along the Western Mediterranean. The characteristic stylistic homogeneity of these ceramics has proven especially resistant to chronological fine-tuning through stylistic analyses and absolute dating. This study uses simple metric indices produced from ceramic rim drawings commonly available in publication for archaeological assemblages to characterize patterns in rim morphology through time and space. The development of methods that easily and successfully improve the chronological resolution of these "resistant" assemblages is essential for projects tackling cause and process. This is the case as applied to the wider goals of this research project, using social network analysis to understand processes that maintain stability of social structures in the Valencian Bronze Age.

Celhar, Martina [282] see Zaro, Gregory

Cercone, Ashley (University of Manitoba) and Kristin Donner (Skirball Cultural Center)

[132] *Ceramics Production and Trade in Western Anatolia: A Reexamination of the Ceramic Mold-Making Process at Seyitömer Höyük in Kütahya, Turkey*

During the Early Bronze Age at Seyitömer Höyük, ceramics began to be standardized in their shape and size through the use of a mold-making process. Evidence from the archaeological record suggests that this innovative technique was incorporated at the site due to the increase in trade and demand for ceramics from other settlements in Anatolia, from nearby Küllüoba to faraway Troy. The early use of a mold-making process established Seyitömer Höyük's pivotal role as a ceramic hub and trading center. This paper provides an overview of the evidence for ceramic production and trade at the site;

and reexamines the current theory of how molds were utilized. Using ceramics housed at the Kūtahya Archaeological Museum and Dumlupınar University Archaeological Museum, we analyze how molds were employed to create an abundance of ceramics and propose a new theory detailing this seminal production process.

[132] *Chair*

Cerda, Melissa

[66] *Discussant*

Cerezo-Román, Jessica (Cal Poly Pomona)

[335] *Cremation Mortuary Ritual among the Classic Period Hohokam and Trincheras Traditions*

Cremation and related fiery rituals performed by Phoenix and Tucson Basin Hohokam in Southern Arizona and Trincheras Tradition populations in Northern Sonora are examined and contrasted in order to understand different regional spheres of social interactions. These were done by examining biological profiles and posthumous treatments of individuals to better understand who they were and how they were treated at death in the Classic Period (AD 1150–1450/1500). These data were compared between sites and at a regional level using quantitative and qualitative data. Preliminary results suggest major differences in cremation mortuary and fiery rituals between the Hohokam of the Phoenix and Tucson Basins. However, similarities were found between the Tucson Basin Hohokam and the Trincheras Traditions on how individuals were treated at death by their peers. These similarities suggest stronger spheres of interaction than previously envisioned between these regions that could possibly relate to shared perceptions of the human body and ideologies related to the use of fire and pyrotechnologies.

Cerimele, Nicole (University of Oklahoma)

[365] *Human-Animal Interactions at the Start of the Middle Holocene: New Evidence from Pit Deposits in Northeast Florida*

Northern Florida has provided some of the oldest evidence of riverine subsistence in the lower southeastern United States, redefining our understanding of how these communities interacted with animals. Previously, these data were restricted to bioarchaeological analyses of mortuary pond assemblages, such as the Windover site. Recent testing at Silver Glen Springs, along the St. Johns River, has uncovered direct evidence of animal exploitation that increases our knowledge of subsistence patterns in the early Middle Archaic. Specifically, excavations below a mined-out shell mound encountered numerous freshwater shell-bearing pits containing remarkably preserved faunal material. Radiocarbon dating has placed this material between 8900–7000 cal BP, and coeval with an apparent increase in surface water availability. This poster presents the results of a zooarchaeological analysis of pit contents, including a determination of species composition, diversity, and depositional treatment. This analysis reveals a heavy reliance on aquatic species, making it among some of the earliest recorded evidence for riverine-centered faunal exploitation in the region.

Ceron, Jasmin (University of Otago)

[229] *The Potentials of Anthracology and the Study of Archaeological Parenchyma in Vietnam Archaeology*

Archaeobotanical studies in Southeast Asia has been gradually developing in the archaeological scene in providing interpretation of the past. In this paper, a macrobotanical study of Vietnam, focusing on the anthracology (wood charcoal) and archaeological parenchyma, was initiated. The principles and methods used by the archaeologists in other regions in the analysis of wood charcoal and parenchymatous plant tissue are applied in the analysis of the plant remains recovered in the archaeological sites in Vietnam. The results will provide significant contributions to address questions relating to the past landscape, managing of the plant resources, seasonality, and the plant usage practices in the region.

Cerquera Benjumea, Gustavo (BAKOTA Project) and Hamima Halim (BAKOTA Project–Johns Hopkins University)

[196] *Death Games: Exploring the Békés 103 Cemetery Using 3D Technology*

3D modeling has become an important tool in the distribution and analysis of archaeological data. This technology also has the potential to make archaeological information more widely available to the public. The goal of this project was to develop an interactive 3D environment based on the Békés 103 cemetery in the Körös region of eastern Hungary. This environment allows users to navigate the site in the first person while examining the burial practices of the Bronze Age people who populated this site. To accomplish this, 3D models of exposed cremation urns and restored vessels were created using a combination of photogrammetry and video production techniques such as green screen, rotoscoping, and Adobe's AfterEffects software. Video production techniques were introduced to the process in order to maximize efficiency in a limited timeframe. Completed models were later incorporated into a 3D environment developed with the Unity game engine. This project can be helpful in demonstrating how 3D technology can be an effective way of collecting, disseminating, and promoting archaeological knowledge.

Cesaretti, Rudolf (Arizona State University)

[277] *Settlement Scaling in Medieval Europe and Tudor England*

From an archaeological perspective, the settlements of Late Medieval Europe lie far to one end of the social complexity spectrum. But from a modern perspective, they are decidedly ancient. Without the institutions and technologies of modern capitalism or the industrial revolution, Late Medieval settlements are commonly characterized as unproductive consumers within dynamic agrarian economies. Both economists and historians have assumed that the benefits of urban agglomeration economies—their economies of scale and increasing returns to scale—are unique to industrial and modern cities. However, recent theoretical advances suggest that the underlying causes of these agglomeration effects come from the density of socioeconomic interactions, and are therefore generalizable to settlements past and present. Here, I present two case studies from Medieval Europe and Tudor England that both exhibit the scaling properties of modern cities. Using a new database integrating historical and archaeological datasets, Medieval settlements are shown to exhibit economies of scale in their use of space. Using historical tax records, Tudor English settlements exhibit increasing returns to scale in economic output during a period widely characterized by “urban decline.” These case studies force us to reconsider the role of settlements and urbanization in premodern economic development in general.

Cesario, Grace (Graduate Center, CUNY)

[35] *The Importance of Wild Animal Resources in Skagafjörður, North Iceland*

In both past and present, pastoralism has been an integral part of life in Iceland. In fact, status is generally defined by how many cattle one can keep; however, wild resources are abundant in Iceland and are also used to supplement the diet. For much of Iceland's history, wild resource use and access was heavily regulated through formal laws and social contracts that often favored elite landowners. Using case studies from Skagafjörður, North Iceland, this paper will explore the use of wild resources compared to domesticates. Preliminary zooarchaeological analyses of sites in the Hegranes region suggest that larger, wealthier farms used fewer and less varied wild resources than smaller, abandoned farms. This differential use of resources hints at the complex relationship between wealth and access to resources and, further, to the ways people would have thought about their use of wild animals—

as a vital part of daily life or as something to be exploited occasionally. I argue that wild resources would have been vital to the smaller farms that could not support a large herd of domesticates, while larger farms likely had a very different relationship with the few wild resources they utilized.

Chala-Aldana, Döbereiner (Institute of Archaeological Sciences, Eberhard Karls Universität Tübingen), Hervé Bocherens (Department of Geosciences, Biogeology, Eberhard Ka), Christopher Miller (Institute of Archaeological Sciences, Eberhard Kar) and Kurt Rademaker (Department of Anthropology, Northern Illinois University)

[143] *Mobility among Hunter-Gatherers in the Central Andean Highlands during the Early-Middle Holocene: GIS Models from Sr and O isotopic Analyses*

Cuncaicha rockshelter (4,480 masl) is one of the highest hunter-gatherer occupation sites found so far in the Americas; it brings new insights about human adaptation to extreme living conditions and subsistence strategies within the Peruvian puna. This research intends to define the possible type of occupation and mobility patterns at the site during the Early and Middle Holocene through Sr and O isotopic analyses in dental enamel of the human individuals and faunal remains found buried in this site. The Pucuncho Basin, in which Cuncaicha is located, presents a particular $87\text{Sr}/86\text{Sr}$ ratio different from the lower-altitude ecological zones that surround it, allowing the assessment of mobility of the individuals, whereas the $\delta 18\text{O}$ provides clues for defining water sources as well as likely elevations where people could live. We conclude with a GIS-developed mobility model based on these isotopic analyses to explain how year-round occupation of the highlands could be the most plausible strategy for surviving and taking advantage of most of the perennial resources available in the puna, such as obsidian for tool making and camelids for hide, bone and meat consumption.

Challis, Sam (Rock Art Research Institute, South Africa)

[28] *Rock Art and Emergent Identity: the Creolization Process in Nineteenth-Century South African Borderlands*

Statements of authorship of rock art necessarily involve statements of identity. What happens, then, when identity is assumed or implied? This paper examines a well-known historical rock art panel in South Africa, supposed to portray a narrative of the demise of the San from their own perspective. To the contrary it finds that in fact the "colonists" sporting wide-brimmed hats and toting guns are, more likely, members of an emergent identity of creolized raiding bands drawn from markedly different precolonial indigenous groups, as well as "runaway slaves" and Europeans.

Chalmer, Nyra (Simon Fraser University), Spencer Greening (Gitga'at First Nation), Chris Picard (Gitga'at First Nation), Ginevra Toniello (Simon Fraser University; Hakai Institute) and Dana Lepofsky (Simon Fraser University; Hakai Institute)

[176] *The Gitga'at-Simon Fraser University (GSAHP) Archaeology and Heritage Project: Developing Community-Based Heritage Management Strategies in Gitga'ata Territory*

The Gitga'at First Nation, traditionally known as the Gitga'ata, of the Tsymysyen peoples on the Northwest Coast of British Columbia is facing major marine developments in their ancestral territory, most notably tanker traffic related to several crude oil and liquefied natural gas export projects. While the Gitga'ata hold extensive oral knowledge about their history and past landscape use, until recently, little was known about the territory archaeologically. To address this knowledge gap, in 2013 the Gitga'at-Simon Fraser University Archaeology and Heritage Project (GSAHP) was initiated to collect baseline archaeological data to inform decision-making related to development and community-driven research initiatives. Over the last several years, the GSAHP research team has investigated over 150 coastal archaeological sites, contributing significantly to our understanding of the Gitga'ata eco-cultural landscape. Many of these culturally significant places are touchstones of Gitga'ata identity, representing an unbroken connection between Gitga'ata people and their ancestors and illustrating the inextricable link between community well-being and their eco-cultural landscape. Through connecting archaeology with community knowledge and oral history, the nation is taking a proactive approach and developing holistic, long-term heritage management strategies reflecting their community's values in the face of developments taking place in Gitga'at ancestral territory.

Chamberlin, Matthew (James Madison University)

[129] *Women's Mobility and Inter-Pueblo Exchange in the Salinas Area, AD 1100–1300*

Katherine Spielmann's work in the Salinas Pueblo area of New Mexico has, among other things, emphasized how ritual and economic interconnectivity among late prehistoric pueblo villages articulates with internal social and cultural changes. One thread of this work, developed by several of her students, has been change in gender relations during the rise of the large towns of the Pueblo IV period (AD 1400–1600), especially involving women's roles in exchange, production, and ceremonial life. Transformations in gendered agency may have been crucial in the development of inter-pueblo exchange in earlier periods in the Salinas area as well, as suggested by evidence of change in women's mobility and involvement in symbolic communication over the transition from dispersed settlements to aggregated plaza-pueblos from AD 1100–1300.

Chan, Annie (University of Pennsylvania)

[33] *The Monumentality of Ancient Pastoral Landscapes in Western Tian Shan (Xinjiang, China)*

This paper examines the spatial configuration of stone structures built for ritual and funerary uses in the steppes of Western Tian Shan based on results of survey and excavation in the Bortala and Ili River Valleys in Xinjiang, China. Marked by clusters of structures attributed typologically to different epochs of human activity, these sites evince a recurring architectural expression of ritual and funerary customs spanning upwards of centuries. The additive process by which some of these structures came into existence, as previous field research in contiguous regions has noted, highlights the temporality of these locales and the perpetuation of pastoral landscapes. In dissecting monumentality, this paper contends that the influence of these structures on routes of movement among early pastoral societies manifests on a diachronic scale.

[33] *Chair*

Chan, Amy (UCLA)

[154] *An Analysis of Funerary Food Offerings and Imagery in Theban Tombs from New Kingdom, Egypt*

Food played an important role in ancient Egyptian funerary practices, but there has not been an examination of the types of food offered. I examined food offerings and their corresponding imagery in Theban tombs from New Kingdom, Egypt (1550–1070 BCE) in order to analyze how food in funerary rituals changed over time. Through museum records, excavation reports, and examinations of artifacts in the British Museum, the Petrie Museum and the Museo Egizio in Turin, I determined the most common food types offered and depicted in imagery in the New Kingdom dynasties. There was more stylistic variation in physical bread molds than in the depiction of bread. Also, the overall amount of food left in tombs and the amount of food depicted in imagery declined during the late New Kingdom. From the stylistic differences between physical bread offerings and their depictions, I conclude that food production in ancient Egypt was open to the general population which allowed for personalized expression as opposed to the limited and controlled medium of illustration. I also argue that there was a shift away from the practice of offering an abundance of food toward simplistic burial customs in response to economic hardship and stylistic preferences.

Chang, Claudia

[268] Moderator
[268] Discussant

Chang, Hong [99] see Cui, Jianxin

Chang, Huaiying

[58] *Resources, Technology, and Distribution: A Discussion on Models of Early Bronze Production in China*

This presentation tries to provide several models to capture major shifts of the bronze production system in the China's Bronze Age. The earliest evidence of bronze production was found in the Yellow River Valley dated to 2500 BC. But during 2500–1900 BC, most products were small bronzes cast by two-part molds. Copper or arsenic bronze products made by hammering also existed but no evidence proves tin bronze technique was yet invented. Around 2300 BC, political entities in the middle Yellow River valley procured the basic skills for bronze manufacturing, which eventually led to the section-molds technique employing tin bronze for casting vessels established about 2100 BC. After the Erlitou period, this technique became the mainstream tradition in Early China producing prestige vessels for elite class in the Central Plains between 1800–1200 BC. The pattern that resources and technology monopolized by the Central Plains dynasty was significantly transformed about 1000 BC due to the expansion of the Zhou Dynasty. The new political regime transferred not only techniques but also the authority to procure raw materials to regional political entities. This change opened the prologue of a new era of bronze production and the exploitation of new ore resources.

Chang, Melanie (Portland State University) and April Nowell (University of Victoria)

[210] *A Census of Women in the Upper Paleolithic*

Binary models of gender are often uncritically applied in paleoanthropology, even if the biological sex or gender identity of a specimen or representation is ambiguous. In the Upper Paleolithic, indicators ranging from simple bifurcating lines to overt representations of secondary sex characteristics may be used to identify an illustration, engraving, or piece of portable art as "male" or "female." These taxonomic rubrics are rarely stated explicitly. Still, the impression given by an overview of the relevant literature is that Paleolithic artists (usually assumed to be male) overwhelmingly objectified females in their works, with corresponding interpretations of the meanings of these representations and the artists' intent that reflect modern biases. We present an empirical survey of human representations in Paleolithic art using an explicit classification scheme that relies on unambiguous markers of biological sex to identify representations as biologically male or female. We attempt to resolve the many ambiguous instances by comparisons to less ambiguous representations and assess the likelihood of abstract representations (disembodied "vulvas" or "breasts") to be intentional representations of females. Within this context, we discuss the difficulties inherent in recognizing sex (much less gender) in Paleolithic art and the consequences of unfounded assumptions in scientific and popular discourse.

Chapman, John and Bissierka Gaydarska (Durham University, UK)

[20] *Can Urban Agglomerations Be Seasonal, Low-Density and Egalitarian? New Interpretations of the Ukrainian Trypillia Megaliths*

Recent geophysical investigations of Trypillia megaliths created a second methodological revolution, following the first revolution (1970s) defined by the discovery of the megaliths and their dating to the fourth millennium BC. So far, this second revolution comprised primarily a methodological advance based upon detailed geophysical prospection; but its potential gains may be subverted without a fundamental re-interpretation of the very nature of megaliths. The prevailing view of the megaliths for over 40 years is as oversized examples of the Childean 'Neolithic package' of permanent settlement, domesticated plants and animals and artifact assemblages containing polished stone tools and pottery. Here, many thousands of people formed large villages, central places, proto-urban sites or fully urban settlements—in effect, the first Eurasian cities. However, doubts about the standard view have emerged from our recent investigations. A tipping-point has been reached for the standard model, with as many as nine lines of independent evidence combining to create such doubts that the only logical response is to replace the standard model with a less permanent, more seasonal settlement mode or a smaller permanent settlement involving coeval dwelling of far fewer people. We consider the new interpretation of megaliths as seasonal, low-density, egalitarian cities.

Chapman Ashlock, Dawn [394] see Ashlock, Phillip

Chappell, Duncan [271] see Huffer, Damien

Chaput, Michelle [227] see Martindale, Andrew

Charles, Douglas (Wesleyan University) and Jane E. Buikstra (Arizona State University)

[102] *Constructing Archaeological Knowledge: Interpreting Hopewell in the Illinois Valley*

Through several books and articles, Martin Byers has developed an interpretation of the Hopewell phenomenon in the American Midwest that radically departs from the general consensus. To date he has focused almost exclusively on Ohio Hopewell. Many of the important sites in that region were excavated almost a century ago and the reports and records are less detailed than we would wish. In his latest book, *Reclaiming the Hopewell Ceremonial Sphere*, Byers seeks to extend his vision beyond Ohio to the Mann Site in Indiana, the Kolomoki site in Georgia, and the Elizabeth and Mound House sites in the lower Illinois River valley. The complex theoretical framework Byers constructs drives his interpretation of Hopewell sites. Our familiarity with the Illinois valley sites as excavators and report authors/editors provides us the opportunity to empirically examine the sequence of construction and use postulated by Byers. We also critically evaluate our own assumptions and biases as they shaped our interpretations at the time. The objective of this paper is not to squabble with Byers, but to examine the role theory and assumption play in the construction of archaeological knowledge.

Charles, Frances

[228] Discussant

Charlton, Michael (UCL Institute of Archaeology) and Jane Humphris (UCL Qatar)

[203] *Experimental Iron Smelting at Meroe, Sudan*

The Royal City of Meroe, situated 250 km north of Khartoum in the Republic of Sudan, was a capital of the Kingdom of Kush from the fourth century BC. Famed for its pyramids and other monumental architecture, Meroe was also home to extensive bloomery ironworks exemplified by numerous slag mounds scattered across the site. Superficial investigation of furnace and slag remains were undertaken in the 1980s and raised numerous questions about the technology. New archaeometallurgical research was initiated by UCL Qatar in 2012 to make sense of the scale and economy of the ancient

iron industry. In concert with targeted excavation of iron-making workshops and materials characterization of metallurgical residues, a series of experimental smelting campaigns were undertaken in 2015 and 2016 in order to test hypotheses about resource use, furnace operation, and workshop organization. Experiments yielded mixed success in terms of slag and iron production, but were nonetheless fruitful in furthering the development of a general iron production model for Meroe. This paper describes the two smelting experiments conducted at Meroe and offers a quantitative assessment of their results. A direct comparison is also made between the experimental findings and the archaeological remains under study.

Charlton, Michael [203] see Humphris, Jane

Charm, Elisheva (Columbia University) and Severin Fowles (Barnard College)

[192] *Indigenous Way Stations of Colonial New Mexico: New Evidence from the Rio Grande del Norte National Monument*

As the horse spread across the American Southwest on the heels of Spanish colonial project, Native American ways of moving were abruptly transformed. This was particularly the case for the many indigenous peoples from the Plains and Rocky Mountains who used equestrianism to build new regional economies based on wide-ranging nomadism. Along with these new ways of moving came a new emphasis on particular sorts of archaeological sites—notably, on the “way station” as a point on the landscape that was owned by none but visited by many different ethnic groups in the course of long-distance travels. In this poster we consider the distinct archaeological signature of colonial era way stations through an analysis of a large archaeological complex surrounding a spring in the Rio Grande del Norte National Monument.

Charpentier, Anne [378] see Speller, Camilla

Chase, Adrian (Arizona State University) and Jonathan Paige (Arizona State University)

[89] *Terminal Classic Chert Use at Nohmul, Belize*

Stone tools and debitage were recovered from Late to Terminal Classic contexts of the site Nohmul in 1978 as part of a dissertation project. Since then, Nohmul has been heavily damaged by a road contractor who used structures from the site as road fill. Additionally, the chert production economy in lowland Mesoamerica has become an issue of great debate. Nohmul is situated roughly 30 km from the Northern Belize chert-bearing zone and 30 km north of Colha, the argued center of lithic production in the region during the Terminal Classic. Consequently, these understudied artifacts from Nohmul have the potential (1) to broaden our understanding of chert consumption and production in the region, and (2) to provide researchers additional datasets for comparison to other Terminal Classic assemblages within and outside the Northern Belize Chert Bearing Zone. Our analysis of the Nohmul assemblage has found evidence for local reduction of cobbles, and core maintenance, as well as production and maintenance of tools. We discuss these findings in relation to the broader chert economy in the region.

Chase, Amy (Memorial University of Newfoundland), Genevieve von Petzinger (University of Victoria) and Oscar Moro Abadia (Memorial University of Newfoundland)

[175] *Neanderthal Artists? Exploring Misconceptions about Neanderthal Symbolic Capacities through Rock Art Studies*

The question of whether Neanderthals created art is one that is currently under debate within the field of prehistoric art studies. Originally thought to be brutish and unintelligent, Neanderthals have recently come to be acknowledged as complex humans with symbolic capacities, through discoveries of Neanderthal-associated modern behaviors including burials, pigment use, and ornament creation. One of the last hold outs separating the symbolic and artistic abilities of Neanderthals from those of Modern Humans (*Homo sapiens*) has been the creation of rock art. This is now being challenged by recent discoveries of possible Neanderthal rock art in Spain and Gibraltar. This paper will discuss what the implications would be if Neanderthals did, in fact, create rock art, and how it would affect the way we study rock art and conceptualize the uniqueness of humans.

Chase, Arlen

[131] *Discussant*

Chase, Zachary [222] see Ore Menendez, Gabriela

Chastain, Matthew (Massachusetts Institute of Technology), Jianli Chen (Peking University) and Xingshan Lei (Peking University)

[213] *Materials Processing in the Production of Ceramic Bronze-Casting Molds from the Zhouyuan area, China, c. 1100–771 BCE*

The extraordinary bronze ritual vessels of Shang- and Zhou-period China were cast in multipart ceramic molds, constructed from many individually formed mold sections. This piece-mold casting method was unique to ancient China, and an essential component of the technology appears to have been the use of a specialized type of ceramic paste to form the casting molds. This ceramic material was soft, porous, and rich in silica, making it quite unlike pottery clays in terms of composition, properties, and apparent techniques of production. This presentation outlines a reconstructed operational sequence for the selection and processing of materials used to make ceramic bronze-casting molds. Western Zhou-period casting molds from three foundry sites in the Zhouyuan area of Shaanxi province were analyzed using petrographic microscopy, scanning electron microscopy, and X-ray and infrared spectroscopy. Replication experiments were conducted using soils collected from nearby the foundry sites. By identifying several activities fundamental to the piece-mold casting process, this research demonstrates the potential for the laboratory analysis of ceramic foundry debris to further our understanding of early Chinese metal-making practices.

Chatelain, David [131] see Canuto, Marcello A.

Chatters, James (Applied Paleoscience), Vera Tiesler (Universidad Autonoma de Yucatán), Andrea Cucina (Universidad Autonoma de Yucatán), Diana Arano Recio (Instituto Nacional de Antropología e Historia) and Pilar Luna Erreguerena (Instituto Nacional de Antropología e Historia)

[140] *The Life of the Adolescent Paleoindian Female from Hoyo Negro, Quintana Roo, Mexico*

Cave divers discovered remains of an adolescent human female in an immense, submerged chamber of the Sac Actun cave system in 2007. Until recently, her remains had only been studied from photographs, photo-based 3D models, and minimal sampling. Now her skeleton has been removed from the cave, conserved, and subjected to bioarchaeological, chemical, and histomorphological analysis. Her unusually complete and well-preserved skeleton, a rarity for late Pleistocene females in the Americas, provides striking insights into the lives of women among the earliest Americans. Naia, as she is known, had endured a healed spiral forearm fracture—a potential indicator of rough handling—and died between 15 and 17 years of age, having

suffered a period of intense metabolic stress in the last months of her life. Radiographs and macroscopic analysis reveal numerous, strongly patterned Harris lines in her long bones, carious lesions, moderate LEH, malocclusion, dental crowding, and delayed development of the mandible, demonstrating that she struggled to maintain a stable protein supply and providing strong hints about the nature of Paleoindian subsistence in Central America. Dated between 13,000 and 12,000 cal BP, Naia's remains join the few other early females to suggest that America's first women led short, difficult lives.

[140] Chair

Chatters, James [86] see Brown, James

Chávez, Andrea [62] see Torres, Mauricio

Chávez Balderas, Ximena M. (Proyecto Templo Mayor/ Tulane University)

[225] *Representing the Underworld: Manipulation and Reuse of Animal Bones from Offering 126*

Offering 126 was discovered during the Seventh Field Season of the Templo Mayor Project. This ritual deposit was buried in the West Plaza of the Sacred Precinct, during the reign of Ahuitzotl (AD 1486–1502). Mexica priests deposited inside a box made of stone slabs, more than 9,000 animal bones from 94 individuals, corresponding to wolves, pumas, jaguars, bobcats and birds of prey, among others. These animals were covered with a layer of marine organisms such as corals, shells, snails, starfish, and sand dollars. On top of these, the priest deposited flint knives and stone sculptures. This impressive offering was covered with the monolith of Tlaltecuhltli, goddess of Earth. In this paper we will present results on the analysis of animal bones, with emphasis on taphonomic processes. We can conclude that all the specimens were buried at the same time, but they were sacrificed over on multiple occasions. Their pelts were used with ritual purposes or as garments, while their bones were preserved in storage. Manipulation of bones in different decomposition stages supports this idea. In addition we will talk about the symbolism of this ritual deposit, characterized by its biological richness.

[119] Discussant

[225] Chair

Chávez Balderas, Ximena M. [225] see Elizalde Mendez, Israel

Chávez Balderas, Ximena M. [293] see Pérez Pérez, Julia

Chazin, Hannah (Stanford)

[242] *Is the Anthropocene a Beastly Problem? Thoughts on Human-Animal Relationships and Contemporary Narratives of Change*

Pizzly bears and coywolves have been making headlines over the past few years. Offspring of illicit pairings between species of charismatic and aggressive megafauna, these hybrid monsters are presented as signs and portents of a troubled future. This paper explores the relationship between contemporary discourses about unruly and uncanny hybrid species and academic efforts to define and engage with the Anthropocene. It questions the relationships between tacit understandings of the animal as a 'determined' entity (to which the human is or is not reducible) and narratives about the human past and the relationship between humans and nonhumans over various timescales. This paper argues that the concern engendered by new, boundary-transgressing hybrid species relies on certain ideas about human-animal relationships. These ideas are shaped by imaginaries of how humans and animals relate as either wild or domesticated—premised on a temporal narrative of increasing human intervention and mastery over the natural world. In contrast, my work on human-animal relationships in ancient pastoralist societies suggests a different way of considering these questions. Viewing the herd as a human-animal hybrid shifts how we tell the history of human-animal interactions, moving the emphasis away from domestication.

[242] Chair

Chen, Fahu [26] see Guanghui, Dong

Chen, Hong

[78] *Determination of Use-Wear Evidence on Quartzite Tools: Experimental and Archaeological Studies*

Use-wear analysis has become an essential method for functional study of archaeological lithic artifacts. Quartzite is one of the main raw materials for lithic tools during Paleolithic period in many sites in the world. However, use-wear studies on quartzite tools are poorly developed due to its poor quality and rough surface. In this paper, the objective is to provide some reference data of determination of use-wear evidence, including both of the experimental and archaeological studies. In order to identify the use wear and their basic pattern on quartzite artifacts, two groups of experiments were conducted in related to the different working motions and contact materials. On the basis of experimental data and reference, some archaeological artifacts from the Wulanmulun site were selected for comparable use-wear analysis. The Wulanmulun site is a new important Paleolithic site in Ordos City of Inner Mongolia, with an age of 60–50ka. About 1500 lithic artifacts were excavated in 2010, which are mainly of quartzite. The analytic results suggest that many lithic artifacts display used wear, and several show hafting wear. Compared to the experiments, the main working motion is considered as slicing and cutting (sawing), and the contact material is dominated by animal substances.

[78] Chair

Chen, Hui (Wuhan University), Zhichun Jing (University of British Columbia), Changping Zhang (Wuhan University) and Weidong Hou (Henan University)

[72] *A Comparative Study on Ceramic Production from Central Plain China and South China in Early Shang Dynasty*

The site of Panlongcheng is located 450 km south of Zhengzhou in present-day Hubei province serves as the join point between the Central Plain Culture and the Lower and the southern regions of Yangtze River. Unlike almost all of more than twenty bronzes vessel shapes are represented in the Panlongcheng finds, there are three different ceramic types discovered at Panlongcheng: Typical Central Plain style (Erligang style), local style and numerous stoneware/hardware (some glazed). In pursuit of studying of ceramic production system on both sites, this Paper presents a comparative petrographic study of full range of variation of ceramic samples from Zhengzhou and Panlongcheng. The results of this research suggest that, despite similarities in type, form and stylistic attributes, the ceramic vessels from Panlongcheng are significantly different from Zhengzhou in terms of temper composition and fire temperature. The significant difference between stoneware and other type of ceramics may suggest that stoneware were nonlocal production. The results of petrographic analyses of ceramic thin sections from both sites may make us rethink the relationships among function, style, pattern, technology and ethnicity in production of ceramic.

Chen, Jianli (School of Archaeology and Museology, Peking University)**[26]** *The Beginning Use of Iron in Ancient China and the Early Silk Road*

This paper analyzes iron objects and iron making remains from the eastern Silk Road area, such as Xinjiang, Qinghai, Gansu, Ningxia, and Shaanxi provinces, and found that there are several characteristics about the development of iron technology: 1) iron production not only related to geographical distribution of ore resources, but also to state pattern; 2) Iron played a vital role in everyday life; 3) The development and transmission of iron metallurgy had some relation to the evolution of bronze metallurgy; and 4) The origin of iron using and making in ancient China was the results of the interaction between China and central Asia areas via the early Silk Road. It suggests to further carry out field survey of iron manufacturing sites in more different areas and to construct a whole sequence of installations and techniques.

[58] *Discussant***Chen, Kunlong (University of Science and Technology Beijing), Jianjun Mei (Needham Research Institute, Cambridge, UK), Thilo Rehren (UCL Institute of Archaeology, London, UK) and Congcang Zhao (Northwest University, Xi'an, China)****[26]** *Trans-cultural Interaction in China's Shang Period: An Archaeo-Metallurgical Perspective*

The production of ritual bronze vessels is an internationally recognized feature of Bronze Age China, contrasting strikingly with other early civilizations across the world. Their manufacture exploded in the Shang period (sixteenth to eleventh centuries BC), when bronze metallurgy spread across the whole territory of present-day China. However, while the production of ritual bronze vessels predominated in the Central Plains, recent research is showing how surrounding regions exhibited strong local characteristics in bronze production, reflecting idiosyncratic ideological, cultural, and technological choices. A "core-periphery" diffusion model to explain Bronze Age metallurgy, rooted in the traditional dynastic evolution, remains the paradigm in both Chinese and Western literature. This mainstream interpretation emphasizes the domination of the Central Plains but oversimplifies the complicated historical trajectories and interactions among many geographically different regions. This paper will present recent archaeometallurgical studies of different regions such as Hanzhong, Northern and central Shaanxi focusing on their material and manufacturing features. The "core-periphery" paradigm will then be reexamined and characteristics of regional metallurgies and their relationships will be discussed further.

Chen, Liang (Northwest University), Yan Zhang (Sichuan Provincial Institute of Archaeology), Jing Zhao (Shaanxi Provincial Institute of Archaeology), Zhouyong Sun (Shaanxi Provincial Institute of Archaeology) and Elizabeth Berger (University of North Carolina at Chapel Hill)**[115]** *Heath and Stress of Ancient People on the Shanbei Loess Slope in China: The Social and Environmental Impact*

This paper investigates the impact of social and environmental changes on the health of people living during the Warring States period (ca. fifth–thirteenth century BC) on the Shanbei Loess Slope, a marginal area that connects the Guanzhong Plain and the Shanbei Plateau. Two human skeletal assemblages representing two different cultural settings, but with a long-standing history of conflict, were selected: 1) Zhaitouhe cemetery (n = 73) (Xirong Culture, the minority), and 2) Shijiahe cemetery (n = 33) (Qin Culture, the dominant majority). Bioarchaeological data including traumatic injuries, osteoarthritis, dental pathology, and other nonspecific stress indicators were examined to elucidate the experiences of violence and labor over the life course, and to infer the social and environmental challenges of living in each of these two groups. Preliminary results from the trauma analysis suggests that the Zhaitouhe-the Xirong minority population experienced a higher risk of violent injuries. In addition, it appears that most individuals in this marginal group lived a lifestyle with more repetitive hard-work than their counterparts in the dominant culture. Bioarchaeological analyses suggest that social stratification has wide-ranging consequences over most if not all aspects of lifeways and life history.

Chen, Maa-ling (National Taiwan University)**[208]** *Movement of People and Its Cultural Reconstructions: Spatial Construction and Cultural Fluidity in Paiwan, Taiwan*

Cultural cognition is figurative, metaphorical, analogical, and participatory in nature. Spatial constructions, presented as figurative patterns, are regarded in this paper as the imagery conceptualization processes. These processes map or encode spatial cognition and relative cultural aspects dwelling in people's minds onto new lands through daily human activities and physically spatial constitutions when people move. Therefore, analyzing spatial constructions of a social group during migration processes is a way to present metaphoric conceptualization processes and conceptual. It would then be possible to identify social groups and their cultural continuities and fluidities during historic processes and movements

Chen, Quanjia (Research Center of Chinese Frontier Archaeology of Jilin University), Jun Chen (Research Center of Chinese Frontier Archaeology of), Ping Ji (Research Institute of Cultural Relics and Archaeol), Chunxue Wang (Research Center of Chinese Frontier Archaeology of) and Yonggang Zhu (Research Center of Chinese Frontier Archaeology of)**[116]** *Preliminary Research on the Bone, Antler, and Tooth Artifacts from Haminmangha Site, Inner Mongolia*

The Haminmangha Neolithic site is located at Horqin Left Wulat Middle Banner, Inner Mongolia Autonomous Region and dates back to 5500–5000 BP according to radiocarbon dating results. More than 100 bone, antler, and tooth artifacts were unearthed from Haminmangha. These artifacts include stone knives with bone handles, bone darts, arrowheads, needle cylinders, needles, daggers, awls, and hairpins, horn, antler awls and borers, tooth ornaments, and other bone and antler materials. According to the analysis of these artifacts, we can deduce the retouching technology and manufacturing process for them as well as the characteristics of the artifacts that deepen our understanding of the production and living conditions of humans at the Haminmangha site.

Chen, Shuxiang and Qifeng Xi (Hubei Provincial Institution of Cultural Relics an)**[58]** *The Management of Techniques and Labor in Copper Production: Based on the New Materials in Tonglushan Sifangtang Cemetery*

Since November 2014, the Hubei Provincial Institute of Archaeology has found 123 tombs in Tonglushan Sifangtang Cemetery, Daye, Hubei province in China. It is the first time for Tonglushan ancient copper mine site and Chinese mining archaeology to find a laborers' cemetery, which is highly related to a mining site. Given its wide distributed area, well-protected situation, and rich clues related to mining culture, this achievement provides significant data for understanding the management of Tonglushan copper production. Therefore, the findings in Sifangtang cemetery offer significant data for the research of the distribution of labor and techniques and the organization of workers during spring and autumn period in Tonglushan, as well as ancient China.

Chen, Wei-chun**[36]** *Test Excavation of the Seventeenth-Century Provincia, a Dutch Fort in the Southwest Taiwan*

In the seventeenth century, Taiwan was considered as an outpost for the Dutch East Indies Company to trade with China and Japan, and to compete with its European counterparts in the region. Located in the contemporary Tainan City, Taiwan, Provincia stood as the Island's first planned city by the Dutch in AD 1625, the second year when they traded the city land with 15 cangan cloth from the indigenous Siraya. In AD 1653, a fort called Fort Provincia was constructed as a result of Han Chinese rebels against the Dutch colonial governance. Fort Provincia and its immediate surrounding area

have continuously been reconstructed and used by various succeeding regimes after the end of the Dutch rule in AD 1662. The excavation of the vicinity of the Fort's foundation carried out by this study yields evidence of early human existence which extends the antiquity of the area around Fort Provintia further back in time. Based on the new findings, this study clearly demonstrates the prolonged duration of cultural changes from the prehistoric past to the historic present. In addition, the evidence shed new lights on our understanding of the successive occupation and the formation processes of the area through time.

Chen, XiangLong

[117] *Farming vs. Herding: Subsistence Practice during the Late Neolithic Evidenced by Stable Carbon and Nitrogen Isotopes in Shengedaliang, North Shaanxi, China*

In order to explore subsistence patterns in northern Shaanxi Province around 4000 BP, human and animal bones from the Shimao, Zhaimouliang, Shengedaliang, Huoshiliang, and Muzhuhzuliang sites were sampled for stable carbon and nitrogen isotope ratio analysis. The results show that most people primarily subsisted on C4 resources, e.g., millet and millet-related animal products, despite the fact that there was some intake of C3 plants by some individuals. Stable nitrogen isotope values indicate that there were differences in meat consumption between individuals at the site. Pigs were mainly foddered with millet and millet byproducts, as well as some cattle, according to their high $\delta^{13}\text{C}$ values. However, the sheep/goats consumed wild C3 plants at those sites. Our above findings indicate that subsistence patterns in northern Shaanxi around 4000 BP were characterized by millet farming, while the grassland animal husbandry (e.g., cattle and sheep/goats raising) displayed very little contribution to local economy. The intensive millet farming in northern Shaanxi provided enough food for population growth, ensured the accumulation of wealth, and consequently accelerated social differentiation and complexity.

[117] *Chair*

Chen, Xuexiang (Department of archaeology, Shandong University) and Wei Gong

[78] *Archaeological Survey of Mound Sites in Southwestern Shandong, China: Plants and People*

The surveyed area, Heze city of southwestern Shandong, China, is located at the lower reaches of the Yellow River. Most archaeological sites in this region were deeply buried, from 3 m to more than 10 m. Very few archaeological works especially excavations had been taken due to the depth. Our survey of 2012–2015 revealed that these sites had been continuously occupied for a long history. The occupation started from Beixin culture (c. 5000–4100 BC), continued to Dawenkou culture (c. 4150–2650 BC), Longshan culture (c. 2650–2050 BC), and to early Bronze Age of Yueshi culture, Shang and western Zhou dynasties. Then they were used as graveyards during eastern Zhou and Han periods. Since Sui-Tang dynasties, there had been temples built on these mounds. About one hundred soil samples were collected and floated during the survey. The results indicated people had been engaged in the dry land agriculture, planting millets (*Setaria italic* and *Panicum miliaceum*), bread wheat (*Triticum aestivum*), soybean (*Glycine max*), as well as explored wet land for rice (*Oryza sativa*) cultivation. Rice remains were mainly from Longshan culture (c. 2650–2050 BC), and declined dramatically after that. This may indicate changes of environment.

Cheng, Wen Yin (University of Toronto) and Chen Shen (University of Toronto, Royal Ontario Museum)

[78] *Mineralogical Makeup of Casting Molds and Its Archaeological Implications for Bronze Making Techniques in Ancient China*

In order to understand how bronze vessels were produced and the knowledge involved we cannot limit our study to simply the bronze vessels themselves. Thus, the analysis on bronze mold production plays a key role to our understanding of bronze vessel production. The focus in this study will be on the 155 mold fragments currently housed at the Royal Ontario Museum, originally from Anyang dated to the Shang dynasty. Petrographic analysis was utilized for this research on raw materials and how the fabrics were processed to distinguish the texture and production method that may have applied to form these artifacts. Mineralogical analysis can shed new light between fabric types and previously distinguished mold forms as well as how distinct the various fabric types were within the different layers of the bronze mold itself. Thus giving us new insight on both the knowledge involved in the mold production and the technology available to the bronze craftsmen of the Shang dynasty.

Cheng, Zhijie and Yuzhang Yang

[78] *Archaeobotanical Records of the Middle and Late Neolithic Plant Food Utilization from North Jiangsu Plain*

As a transition zone between southern and northern China, the Huai River valley possesses distinct uniqueness in climate, environment, agriculture, archaeological culture, and other aspects. We have taken a series of archaeobotany case studies on the Neolithic sites of different period, such as Shunshanji, Longqiuzhuang, Wanbei, in the lower Huai River valley. Combined with previous archaeobotany research in this area, we can summarize the plant food utilization in various periods. The clue of plant food utilization is not consistent in the lower Huai River. According to the existing archaeobotany evidence, this area stayed in a stage of low-level food production for a long time during 8500–6500 BP. Gathering was the uppermost way to obtain plant food; rice farming was a supplementary means of livelihood. As a lack of enough archaeobotany evidence, it is not clear how the plant food utilization developed during 6500–6000 BP. The rice farming tradition was in continuation. After 6000 BP, the mixed-farming of rice and millet came into being and developed rapidly in the lower Huai River valley. But it was different from the mode of the upper reaches; rice farming was of equal importance with millet farming.

Cheng, Zhijie [78] see Yang, Yuzhang

Chenoweth, John (University of Michigan-Dearborn), Mark Salvatore (University of Michigan-Dearborn) and Laura Bossio (University of Michigan-Dearborn)

[265] *British Peasant Ideologies and Technological Approaches to Marginal Caribbean Landscapes*

British colonial ideology originated, in part, from a view of the proper relationship between people, land, and government that was rooted in the ecology of Britain itself. This view was informed in the Caribbean by Barbadian and other large-scale sugar planting colonies, but the British Virgin Islands are ecologically and politically distinct. This paper employs high-resolution satellite imagery and GIS modeling to explore what happens when a British "peasant" ideology is laid onto a very different Caribbean landscape in an end-of-slavery experiment intended to place free Africans in their "proper" role. These data are combined with historic maps to analyze the different productive potentials of different parts of the site of Kingstown, British Virgin Islands, home to a group of free Africans settled there by the British Government in the 1830s. While the Kingstown people's response was probably complex, this paper explores the limits under which they would have worked, had they employed the British model.

Cheong, Kong (American University)

[347] *Chirping Birds, Barking Dogs, and Singing Men: Ancient Ceramic Effigy Vessel Flutes from Tala, Jalisco, West Mexico*

Duct flutes are an important class of aerophone instrument among the ancient and modern indigenous Americans. Duct flutes can be further classified into tubular and vessel types. While they are widely distributed, vessel flutes, unlike tubular flutes, are rarely depicted in regional iconographies. This is

perhaps because they are small in size and generally hidden by the player's hands and are thus difficult to portray in murals, vases and sculptures. However, this is not the case in West Mexico as data from our survey of online museum databases shows, they are third most commonly represented in ceramic sculptures. In this paper we describe, and examine, a collection of seven unpublished ceramic vessel flutes from Tala, Jalisco, Mexico.

[347] Chair

Cheong, Kong [173] see King, Adam

Chesson, Meredith S. (University of Notre Dame)

[141] *"It comes from gathering": Collaborative Archaeology and Future Directions*

This session interrogates the practice, theoretical foundations, and outcomes of collaborative archaeology, and explores how collaborators are transforming our discipline today. Today's papers demonstrate how collaborative archaeology offers epistemological resources that traditional, public and even community archaeology cannot provide, and how collaborative approaches force us to reexamine the disciplinary goals, practices, and outcomes of archaeological practice widely. We have divided the session papers into three broad themes: (1) Service: Working for Communities, Not on Them, (2) Conflict Resolution and Archaeological Engagement, and (3) Redefining the Discipline of Archaeology. As an example, I briefly present ethnoarchaeological research on homemaking on the islands of Inishark, Inishturk, and Inishbofin in western Ireland, highlighting how the documentation of delph, dressers, and shop ledgers serves these communities in preserving and celebrating island heritage today.

[141] Discussant

[141] Chair

Chesson, Meredith S. [142] see Kaya, Deniz

Chevez, Estrella [162] see Winterhalder, Bruce

Chhay, Rachna [333] see Carter, Alison K.

Chia, Richard (Simon Fraser University)

[77] *Historical Ecology of Tiv Migration and Conflicts in the Benue Valley of Nigeria: Implications for Food Security*

When the Tiv, a Bantu language speaking group migrated into the Benue Valley of Nigeria from southwestern Cameroon over five hundred years ago, they faced hostilities from different groups in the valley. Hilltops readily served as important settlement locales to protect the Tiv from violence and conflict. As they migrated from one hilltop to another they eventually settled over much of the Middle Benue Valley. Archaeological research in the valley has investigated these ancient hilltop sites with emphasis on Tiv migrations and settlement history. But none of these investigations has considered the role of the biophysical environment regarding food resources and food production. This presentation reports on the ongoing archaeological research to investigate the relationship between conflict and food production by the hilltop communities, and resilience to food crises during such conflicts. Using archaeological, ethnographic, ecological, and historical data these findings will address issues of conflict and food security in the valley today.

Chiarulli, Beverly (Indiana University of Pennsylvania), Eleanor King (Howard University), Anne Pyburn (University of Indiana Bloomington) and Anabel Ford (University of California Santa Barbara)

[9] *A Comparison of Expedient Tools from Four Sites in Belize*

Small lithic flakes have been recovered from most Maya sites in Belize. They are often viewed as byproducts of the lithic manufacturing process. A closer analysis of small flakes recovered from four sites (Cerro, Chau Hiix, Maax Na, and El Pilar) has found that while many of the flakes may have been removed during tool manufacture, the expedient tools themselves were used in a variety of household activities especially those associated with cutting or carving bone or wood. This poster compares flake samples from these four sites to determine if the flake tools reflect economic differences in the communities.

Chiarulli, Beverly [83] see King, Eleanor

Chicoine, David [231] see Whitten, Ashley

Childs, Terry (Department of the Interior)

[315] Discussant

Chilton, Elizabeth (UMass Amherst)

[311] Moderator

[311] Discussant

Chinchilla, Oswaldo (Yale University)

[218] *American Pompeii: Old Evidence on Late Classic Ties between the Pacific Coast and the Antigua Valley*

An archaeological collection from finca Pompeya in the Antigua Guatemala valley provides significant information about Late Classic interaction with the adjacent Pacific coast. Excavated in 1893, the collection was eventually scattered to several museums in Germany, the United States, and Guatemala. However, it can be reconstructed from a photograph made not long after the discovery, and from newspaper reports that provide rough descriptions of the excavations. The objects themselves are still preserved, and provide important data for the study of highland-coastal interaction during the Late Classic period. This time period marked the height of the expansion of the Cotzumalhuapa polity in the coastal piedmont of Escuintla, which exerted a strong influence in elite culture at several sites in the Antigua Guatemala valley. The Pompeya collection also illustrates the history of early archaeological research and collecting in Guatemala.

[39] Discussant

Chinique de Armas, Yadira (Department of Anthropology, University of Winnipeg)**[30]** *Sources of Variations in Breastfeeding and Weaning Practices among Caribbean Populations*

Breastfeeding in humans is a biocultural process shaped by complex interactions of beliefs about health and nutrition, construction of childhood and parental identities, religious values, and lifestyle. While some studies have stated that the type of subsistence does not determine weaning ages in a population, these factors could have affected weaning food choices. This paper analyzes carbon and nitrogen stable isotopes in bone collagen of four precolonial Caribbean populations: Paso del Indio (Puerto Rico) and Canimar Abajo, Cueva del Perico I and Cueva Calero (Cuba) to explore how the subsistence strategies affect the length of breastfeeding and weaning food choices that these Caribbean populations made in the past. Ages for the start and the end of weaning and possible food sources used during the weaning process were assessed using the Bayesian probability model "Weaning Ages Reconstruction with Nitrogen isotopes" (WARN). The model suggested a major dietary change around two years of age for most populations. No direct correlation was found between the start of weaning and the availability of cultigens. However, populations with agriculture or horticultural practices weaned their children using foods with lower nitrogen isotopic values, which suggest that plants may have had an important role as weaning foods.

[30] *Chair*

Chinique de Armas, Yadira [30] see Buhay, Bill M.

Chiou, Katherine (University of California, Berkeley) and Luis Jaime Castillo (Pontificia Universidad Catolica del Peru)**[174]** *Performing the Moche Feast: Plants, Ritual Practice, and Spectacle in the North Coast of Peru*

The site of San José de Moro in the Jequetepeque Valley of the North Coast of Peru is renowned for the discovery of several "Priestess" burials containing women interred with the material accoutrements of the goddess figure from the Moche pantheon. As a burial ground for the Moche elite, San José de Moro presents an excellent case study for ritual performance with burial-related ceremonies taking place concurrently with feasting. In this paper, we discuss the plant evidence for large-scale feast preparations at San José de Moro during the Late Moche period (AD 600–800) where archaeobotanical remains of sacred plants such as the San Pedro cactus (*Trichocereus* sp.) and coca (*Erythroxylum* sp.) were recovered alongside substantial quantities of domestic food taxa such as algarrobo (*Prosopis pallida*), guayaba (*Psidium guajava*), chile pepper (*Capsicum* spp.), and maize (*Zea mays*). This case study is part of a budding research trajectory that shifts plant analysis beyond subsistence reconstruction and into the realm of social negotiation including ritual practice.

Chiou-Peng, TzeHuey (Univ. Illinois UC) and Jianfeng Cui (Peking University)**[26]** *Incipient Metallurgy in Western Yunnan: Current Study and Issues*

This work discusses results from current studies and issues on the production and use of early Yunnan metals, as well as possible interaction between western Yunnan sites and their counterparts in surrounding regions. Archaeological materials from recent excavations at western Yunnan sites witness the earliest signs of copper-base metallurgy in Yunnan dating around the middle of the second millennium BC; they offer illuminating data for studying the step-by-step development of metallurgy in the region. However, current research on the nascent stage of Yunnan metal industry also has generated a good number of issues for continuing research and speculations. Multidisciplinary analysis of excavated materials from these sites points to the possibility that impacts from cultures near the Steppes in northwestern China had contributed to the advent of metals into Yunnan; the underlying factors that propelled such unique north-to-south technological transmission are also beginning to be understood. However, a number of questions pertaining to stratigraphy and chronology also demand to be examined in conjunction with the narratives of east Asian archaeology in order to invite meaningful discussions from broader perspectives.

Chiriboga, Carlos [131] see Acuña, Mary Jane

Chirikure, Shadreck (Department of Archaeology, University of Cape Town, South Africa)**[138]** *Cross-Craft Overlaps in Materials and Symbolism: Insights from Legacy Crucibles from the Great Zimbabwe Archive*

The legacy collections from Great Zimbabwe (CE 1000–1700) emanated from uncontrolled treasure hunting expeditions of the late nineteenth and early twentieth century and the sporadic professional digs conducted at various points throughout the twentieth century. As a result of this colorful history, most materials from the site are scattered in different archives where they are gathering dust with little or no research being performed. This contribution discusses a technological and typological analysis of crucibles from the legacy collection spread across Zimbabwe and South Africa. The crucibles were used for processing gold, bronze, brass, and copper at the site. Typological studies revealed the existence of specialized and non-specialized vessels, which were used for identical technical purposes. However, the non-specialized crucibles resembled quotidian pottery used for mundane activities. Quite interestingly, metallurgy and pottery-making are often portrayed as distinctly gendered pursuits, with minimal overlaps in symbolism and the participation of men and women. Geochemical and mineralogical work exposed that the two types of vessels were made using clay from the same granitic derived lithology. This raises significant questions about material and symbolic overlaps in pyrotechnologies that used the same materials and symbols in the indigenous development of African metallurgy.

Chisholm, Brian [258] see Hepburn, Joseph

Chisolm, Linda [257] see Urban, Thomas

Chiu, Scarlett (Academia Sinica, Taiwan), Nicholas Hogg (University of Otago, New Zealand), Yu-yin Su (University of Sheffield, United Kingdom) and Shih-Ya Chang (Academia Sinica, Taiwan)**[374]** *Stressing Differences While Appearing to Be the Same: A Case Study from Lapita Pottery Motif Analysis*

In previous research, employing a dataset composed of motifs recorded from 60 Lapita sites spread across the southwestern Pacific, we argued that a general trend of making highly similar, but not identical, motifs can be seen when motif repertoires of different island groups are compared. We thus proposed that the elements of surprise or amusement, generated from making something similar yet different from what the intended audience expected to see, was employed to stress shared traditions while also making a statement of being different, may be the underlying concept of making Lapita pottery decorations. In this paper we intend to examine the underlying motif construction rules employed by potters within these different island groups during the Lapita era, to identify whether they had specific preferences as to the rules used when applying motifs belonging to the ten most popular motif themes within our dataset.

Chiykowski, Tanya (Binghamton University)**[266]** *Impressive Terraces and Ephemeral Houses: Domestic and Defensive Architecture at Cerro de Trincheras*

Around AD 1200, Trincheranos (members of the Trincheras Tradition of the Sonoran Desert) covered the hillside of Cerro de Trincheras, Sonora, Mexico in over 900 terraces. After such extensive investment in shaping and laying out space within the site, they then proceeded to live in relatively ephemeral domestic structures on the hillside. This paper addresses the apparent contradiction of impermanent houses on robust platforms by examining how Trincheranos built, maintained and managed space within the site. To do so, I present excavation data from Cerro de Trincheras, and surrounding sites. The construction of this site occurred during a period of population movement and upheaval, with large-scale migration, and site establishment in the middle Magdalena Valley. Placing domestic architecture at the center of my analysis provides a perspective for how the interrelated components of domestic, ritual and community architecture impacted the economic, social and religious behavior at the site.

Chmilar, Jennifer [44] see Vadala, Jeffrey

Choi, Audrey (Wellesley College), Jaime Ullinger (Quinnipiac University) and László Paja (University of Szeged)**[196]** *Identifying Pre-Incineration State from Heat-Induced Fracture and Warping Patterns Found on Human Cremains in a Hungarian Bronze Age Cemetery*

Attempts to determine the status of human remains prior to their final deposition are complicated in the analysis of cremains. Forensic and archaeological studies, however, have advocated for the interpretation of heat-induced fracture and warping patterns as indicators of the pre-incineration state of the body and of the characteristics of the funeral fire. The purpose of this research is to examine the possible internal social structures of a Bronze Age population in the Körös region of Eastern Hungary by testing whether or not trends in the distribution of macroscopic heat-induced features exist across the cemetery site of Békés 103. Fragments from fourteen cremation urns were assessed for the presence of diagnostic fracture and warping patterns according to their anatomical region. Their relative frequencies were then compared among human burials, among urn layers, and among individual bone fragments that exhibited colors possibly indicative of temperature exposure. Results reveal that statistically significant differences in the frequencies of a few features, such as postcranial warping and "thumbnail" fractures, exist and may suggest the presence of discrepancies in bone biomechanics and/or funerary preparations within the examined sample of Békés 103.

Choin, Jeremy [330] see Damgaard, Peter de Barros

Chovanec, Zuzana (University Albany)**[173]** *The Scientific Investigation and Cultural Implications for the Use of Prestigious Substances in the Ancient Mediterranean*

The role of organic residue analysis in archaeological research has shifted from an intermittent side project of interested analytical specialists to becoming standard components of an archaeological research program with a growing number of archaeologists being trained in both excavation and analytical instrumentation. Such developments within the field of archaeology not only highlight the benefits of applying a range of scientific techniques, but also expand the scope of archaeological research questions. However, as organic residue analysis becomes an increasingly technical and specialized subdiscipline of archaeology, much explanatory time focuses on integrating scientific data with archaeological material correlates with perhaps less consideration of broader anthropological implications. This paper aims to examine the interpretative progression from archaeological site, through scientific analysis, and ending with broader cultural implications as they pertain specifically to the case of the use of psychoactive substances on the eastern Mediterranean island of Cyprus. The investigation of the history of intoxication in the Mediterranean Basin is fraught with interpretative problems, chief among which is the fact that the substances being investigated have long histories of use with wide geographic ranges. Further issues that will be addressed pertain to the documentation of organic substances in prehistoric settings.

Christensen, Alexander (Defense POW/MIA Accounting Agency)**[41]** *Reconstructing Korean War Battlefields from Body Recovery Information*

During the Chinese Spring Offensive of April and May 1951, Chinese People's Volunteer Forces pushed United Nations troops back from their defensive lines in the Republic of Korea, with extensive casualties on both sides. Because UN forces were driven back, many of the dead were not recovered and identified until the battlefields were retaken. In some cases this occurred days after the battle, but for many it was weeks, months, or even years later. Individual Deceased Personnel Files (IDPFs) for each casualty provide information on where remains were recovered, the condition they were found in, and the identification process. The IDPFs from two different battles, the 7th Infantry Regiment's defense of the Kansas Line on April 25, 1951, and the 2nd Infantry Division's defense of the No-Name Line 24 days later, were examined to investigate the distribution of casualties across each battlefield, and in particular how the recovery locations fit with more traditional historical accounts. In general, files for individuals recovered immediately after the battles contain the least information about the condition and location of the remains, while those recovered later, by personnel not involved in the battles, provide artifactual, anthropological, and archaeological context, including inventories and sketch maps.

Christiansen, Eric [237] see Searcy, Michael

Christensen, Kim (University of California Berkeley)**[122]** *Archaeological Pedagogy, Gentrification and the City: Community-Engaged Scholarship in San Francisco*

The Bay Area, and San Francisco in particular, is experiencing rapid gentrification due to the influx of highly paid workers employed by the tech economy centered in Silicon Valley. As the cost of living increases, long-time residents are being actively pushed out, and various community organizations have sprung up in response to highlight and address these issues of gentrification, displacement, and homelessness. In this paper, I explore the process and results of partnering with community groups including the Anti-Eviction Mapping Project during the fall of 2016 as part of teaching an introductory archaeology class for the UC Berkeley/UC Extension San Francisco Fall Program for Freshmen and the American Cultures Engaged Scholarship (ACES) program. While archaeological methods and interpretations can bring understanding to change over time, persistence, and historical context, how in particular can we contribute meaningful and useful information to community partners fighting contemporary displacement? How can an engaged pedagogy contribute to both student learning and social justice? While this is only the beginning of a longer-term research program, this paper appraises the benefits, pitfalls, and paths forward for engaging archaeological knowledge with teaching and learning and pressing local contemporary issues.

[122] *Chair*

Christensen, Marianne [231] see Morello Repetto, Flavia

Christie, Jessica (East Carolina University)**[179]** *Navajo Landscape Construction at Canyon de Chelly: A Quintessential Place*

My paper will discuss how the Navajo construct Canyon de Chelly as a quintessential place on the reservation. The canyon has been occupied at least since Basketmaker times in the first centuries AD. Archaeological investigations have identified Ancestral Pueblo cliff dwellings from roughly AD 700 to 1300 followed by a brief Hopi presence. Navajo people began to settle Canyon de Chelly in the late 1700s. Unlike the Ancestral Pueblos, the Navajo lived on the canyon bottom and reused some of the facilities of their predecessors for storage. They also added their rock art to earlier panels. What makes Canyon de Chelly a quintessential place unlike other historical sites on the reservation are the rich oral narratives populated by the ancestral Holy People, which claim the canyon as Navajo intangible heritage. I will analyze these processes through White House ruins and Spider Rock where archaeological materials and ceremonial knowledge have been dynamically linked to construct a decidedly Navajo political history. The argument that the Navajo have been in the canyon as long as their spiritual ancestors, the Holy People, has been used in land claims cases. Canyon de Chelly is being reinvented as quintessential place in spiritual, political, and economic contexts.

Christie, Jessica [272] see Watson, Lucia Clarisa

Christopher, Ssebuyungu [153] see Ziegler, Michael

Chyla, Julia (Antiquity of Southeastern Europe Research Centre, University of Warsaw)**[316]** *El Castillo and Its Regional Context in Huarmey Valley through GIS*

Huarmey valley, at the southern fringe of Peruvian North Coast, was inhabited for millennia. It is a rich, multi-cultural area, where almost all types of archaeological sites are represented. The discovery of an imperial mausoleum at El Castillo in 2012/2013 is an example how little we know about this region. During the previous seasons modern state-of-art techniques of documentation were used on daily basis at the time of excavations. The successful attempts to implement new noninvasive, remote sensing techniques of archaeological prospection on precolumbian sites resulted in the development of highly accurate, rapid and relatively inexpensive methods of evaluation and inventorying of the Peruvian heritage. Spatial data collected at the time of excavations, especially of mausoleum and remains of architectural monuments around, as well as those gathered during archaeological survey of the valley rise a lot of questions about the site's role in social and geographical landscapes of Wari Empire during the Middle Horizon period. Proper process of gathering, processing archival, field, and digital data allows to expand our knowledge about the past and reconstruct its forgotten landscapes.

Ciani, Michael**[385]** *The Bear in the Footprint: Using Ethnography to Interpret Archaeological Evidence of Bear Hunting and Bear Veneration in the Northern Rockies*

Archaeological evidence of prehistoric bear hunting and bear veneration in the northern Rocky Mountains and northwestern Plains is presented. Ethnographic documents and the writings of trappers, traders, and explorers are assessed in order to establish an interpretative framework to help decipher archaeological contexts in the region that include bear remains and rock art depicting bears. Examining prehistoric archaeological contexts in Montana and Wyoming within this framework suggests evidence of bear hunting and veneration similar to the regional ethnographic record. Data trends imply there may be a relationship between such sites and variables like location, seasonality, function, and age. Contexts with bear remains sometimes imply a winter occupation, and site constituents hint at the ritual treatment of bear skulls and paws. An apparent increase in bear hunting during the Late Prehistoric Period may have been influenced by the bears association with warfare and healing. Possible motivations for hunting are explored and include economic, social signaling, bear power attainment, and revenge incentives. Compatible theoretical approaches are briefly articulated in an effort to more clearly understand bear hunting and veneration in ecologic, symbolic, and utilitarian terms.

Ciesla, Magda (Jagiellonian University in Kraków), Anna Kraszewska (Jagiellonian University in Kraków) and Pawel Valde-Nowak (Jagiellonian University in Kraków)**[389]** *Reworked Artifacts and Models of Raw Material Exploitation as Indicators for Settlement Duration on Middle Paleolithic Sites in the Highlands of Central Europe*

Short-term settlement of Middle Paleolithic hunters leaves a specific tool kit on an archaeological site. In spite of this well-known fact, in some cases, concerning the duration of stay of groups of Neanderthals, mere techno-typological analysis of inventories seems insufficient. Analysis of raw materials exploitation, combined with information about long use, or reworking of certain artifacts appears to be helpful. On most sites from the Middle Paleolithic era, archaeological data, concerning the subject of raw materials extraction shows, that it generally had a local character. Although this is most typical, sometimes the situation is different. On a range of sites, known from uplands of Hungary, Slovakia, and Poland, artifacts prepared of raw material transported from long distance outcrops can be found (sometimes they were brought to the site from the distance of more than 300 km). Such artifacts are usually reworked, showing traces of their long use and value for prehistoric people. In some cases, they also appear in the context of first settlement on a particular site, suggesting a migration. It can also be assumed, that there exists a link between the settlement duration and the knowledge about explored area, which can be observed in some inventories.

Cifarelli, Megan (Manhattanville College, New York)**[379]** *The Materiality of Life and Death: Dress Ornaments and Shifting Identities at Hasanlu, Iran*

The site of Hasanlu, Iran, was destroyed thoroughly by a marauding army in approximately 800 BCE, leaving a hulk of smoking rubble that was a virtual tomb for the hundreds of residents and combatants who weren't able to escape its citadel. The excavations of Hasanlu, led by Robert H. Dyson of the University of Pennsylvania Museum, took place between 1956 and 1977, and uncovered a remarkable range of contexts containing personal ornaments within the relatively narrow historical horizon of Hasanlu Period IVb (ca 800–1050 BCE). From the bodies of fallen victims, to temple treasuries and elite residences, to a cemetery with nearly 100 burials, the artifacts relating to dress and adornment played a critical role in the construction and perennial renegotiation of identity for the men and women at Hasanlu. This paper examines shifts to dress practices at Hasanlu during this period, arguing that transformations to the regulatory schema by which objects and individuals are gendered are manifestations of changes to the way this community conceived of gender as a social category.

Cinquino, Michael [175] see Hayward, Michele

Ciolek-Torello, Richard (Statistical Research, Inc.), Jeffrey Altschul (Statistical Research, Inc. and NEXUS), John Olsen (University of Arizona), Ch. Amartuvshin (Mongolian Academy of Sciences Institute of History) and B. Gunchinsuren (Mongolian Academy of Sciences Institute of History)

[113] *Fortified Towns in a Nomadic Pastoral Landscape on the Mongolian Steppe: Bai Balik and the Northern Railways Archaeological Project*
Mongolia is well-known for its history of nomadic pastoralism and Bronze and Early Iron Age burials and monuments. For a brief period in the eighth and ninth centuries, however, the Uyghur and Khitan Khanates built large towns and urban centers. One of these, Bai Balik was established about 758 CE during the northward expansion of the Uyghur Empire, by the Uyghur khagan, Bayanchur Khan as a ceremonial and trading center in the fertile and strategically located Selenge Valley. This well-known site, which was tested by a Japanese archaeological team, was recently recorded as part of a project conducted by the Mongolian International Heritage Team to provide recommendations on the routing of a proposed Northern Rail Link between Murun and Erdenet, in Northern Mongolia. Historical records, archaeological survey, and mapping are used to investigate the role centers such as Bai Balik may have played in the nomadic pastoral economy of the Mongolian Steppe. Specifically, we examine the size and layout of the town, the ethnic makeup and economic activities of the town's population, and the possible role of agriculture.

Cipolla, Craig (Royal Ontario Museum)

[334] *Deep Impacts of Mohegan Archaeology: Indigenous Knowledge and Its Influence on the Past*

There is no doubt that indigenous, collaborative, and community-based projects have made great strides in reshaping the ways in which archaeological research is conducted and carried out in North America. Comparatively speaking, however, reporting on collaborative projects often place less emphasis on the ways in which indigenous and hybridized versions of archaeology influence our interpretations of the past and penetrate archaeology at the level of theory. In this paper we attempt to fill this void, critically considering our collaborative work together in terms of deeper impacts that indigenous knowledge makes. We argue that our work together produces new and valuable perspectives on time and temporality, archaeological "data" in general, anthropocentrism, and colonial interaction and survivance. We discuss these insights in terms of several eighteenth- and nineteenth-century sites on the Mohegan Reservation in Uncasville, Connecticut.

[269] *Discussant*

Cisar, Amelia [345] see Munger, Tressa

Cissell, Madison (Morehead State University, Craft Academy), Carlos Peraza Lope (Centro INAH Yucatán) and Timothy Hare (Morehead State University)

[9] *Mapping and 3D Modeling of Mayapán's Monumental Center*

During our 2016 field season, we mapped and created 3D models of Mayapán's monumental center and several major architectural features. Located in the Northern Yucatán approximately 40 km south of Modern Mérida, Mexico, Mayapán was the largest ancient Maya political capital of the Postclassic Period and was one of the most densely nucleated of all Maya cities. It was a key center of political, religious, and economic activity. Mayapán's monumental zone is relatively small, but contains a dense collection of temples, colonnaded halls, palaces, altars, and addition structures. We used unmanned aerial vehicles (UAVs/drones) to carry photographic equipment to collect both vertical and oblique photos and videos of the consolidated architecture. The resulting images were processed in photogrammetric software to generate an orthorectified photo mosaic and several 3D models major architectural features. These products were integrated into a geographical information system (GIS) to facilitate analysis. In this poster, we outline the technology and data processing workflow used and display the resulting products.

Cissell, Madison [336] see Hare, Timothy

Claeys, Philippe [69] see Snoeck, Christophe

Clarenne, Valérian [40] see Coppe, Justin

Clark, Barbara

[206] *Discussant*

Clark, Bonnie (University of Denver)

[141] *Healing through Heritage: Collaborative Archaeology as Process*

Heritage is never static, rather it is a constantly evolving set of practices, beliefs, and tangible touchstones. Collaborative archaeology sits firmly in that thicket, whether through the data we uncover, the stakeholders we engage, or even the media attention we draw. The archaeology of Amache, the site of a World War II-era Japanese American incarceration camp, is an exemplary test case for how research intertwined in a contemporary community can recast our discipline's relationship to heritage. This paper explores the potentially radical shift from a focus on the results of archaeology to that of the practice of archaeology. Framed by critical heritage studies, especially Laurajane Smith's conceptualization of how heritage is a process, this presentation will highlight some ways archaeologists can enable or hinder engagement, especially at a site of civic injustice. At Amache, project success has been greatly enhanced through creating opportunities for intergenerational dialogue and exploration of suppressed histories. Also critical is embodied experience of a place sometimes only known through the silences around it.

[141] *Discussant*

[141] *Chair*

Clark, Caitlin [21] see Albert, Rebecca

Clark, Dylan (University of North Carolina at Asheville)

[329] *Sea Change: Maritime Maya Lifeways, Social Organization, and Dynamics at the Port of Isla Cerritos, Yucatán*

Mesoamerican archaeology typically approaches social, cultural, political, and economic dynamics from a center-periphery perspective, tracing the historical pulses of integration and disintegration through the lens of the urban centers of the social and cosmological landscape. While the coastal Maya may seem peripheral geographically, maritime communities were actually central integrative forces throughout their dynamic histories. They facilitated and motivated movements and interactions of people, goods, and ideas within and beyond cultural regions and simultaneously stimulated sociocultural

change. In this paper, I shift the viewpoint from inland to the coast, focusing on recent household archaeology at the island port of Isla Cerritos, on the Gulf coast of central Yucatán. The study addresses the question of social organization and change within the small resident population, as well as the sociocultural and political relationships with contemporaneous coastal and inland sites—especially Chichén Itzá. Moving between scales of archaeological data, from a single artifact assemblage and house mounds, to settlement patterns at the levels of site and region, I examine what we know about social life at this port from 300 BCE to 1500 CE and what a coastal Maya case study adds to our consideration of the social-historical dynamics of the northern Maya lowlands.

Clark, Jeffery (Archaeology Southwest)

[303] *Not Quite Coalesced: Salado Settlements in the Upper Gila*

Most fourteenth-century Salado settlements in the Upper Gila watershed are comprised of separate room blocks in both planned and ad hoc configurations. These spatial arrangements suggest that integration, and by extension coalescence, was never fully achieved despite occupation spans of more than a century. This poster examines ceramic and other material culture variability among room blocks within four settlements to identify social and cultural differences that persisted until depopulation in the early fifteenth century. Of particular interest is evidence for the co-residence of various immigrant and local groups who maintained deeply engrained traditions while closely interacting with each other on a daily basis.

[335] *Discussant*

[303] *Chair*

Clark, Julia (American Center for Mongolian Studies)

[114] *Shifting Mobility Strategies in Neolithic and Bronze Age Mongolia*

Mobility is a central part of the contemporary, traditional, historical and prehistorical economic strategies employed by hunters and pastoralists in Mongolia. While mobility is often contrasted with sedentism, there is much variation within the practice of “mobility” and how it is employed. Residential and logistical mobility are often used heuristics to discuss variations in mobility. A critical application of these terms to the archaeological record of Northern Mongolia illustrates their utility, and tracks potential shifts in the mobility strategies of prehistoric and early historic populations who were undergoing great changes in their economic practices as hunting decreased and herding increased in the Neolithic and Bronze Ages.

[114] *Chair*

Clark, Melissa (Ohio State University)

[235] *Interpreting the Archaeology of Pregnancy Loss*

The status of pregnancy loss as taboo in Western culture, as well as the poor preservation of fetal remains, contributes to the absence of pregnancy loss from the anthropological study of funerary practices. Furthermore, pregnancy loss is rarely viewed by society as a legitimate cause for bereavement and perhaps consequently, has been overlooked in the archaeological record. Additionally, grief associated with a miscarriage or stillbirth is often described as a novel phenomenon, while parental attitudes toward children in post-Medieval to modern Ireland historically have been characterized as detached and apathetic with little regard for the value of individual life. Moreover, it has been argued that pregnancy loss was regarded as insignificant.

Archaeological, ethnographic, and biological evidence, however, suggest that Irish mothers likely mourned the loss of a fetus, and that grief for a lost pregnancy is not a modern phenomenon.

Clark, Terence (University of Saskatchewan)

[387] *Beyond House Floors: The Logistics of Northwest Coast Plank-house Villages*

Household archaeology has a long and fruitful history in Northwest Coast archaeology. Excavation at numerous sites has provided detailed data on living surfaces and activity areas, but the greater dynamics of household and village organization remain elusive. This paper looks at important, but neglected functional constraints of plank-house villages, namely the need for firewood, potable water, and disposal of waste. These factors, which almost certainly informed on the construction and maintenance of villages while also acting as potential drains on their social cohesion, structured the archaeological record being studied.

[256] *Discussant*

Clark, Tiffany

[129] *The Production and Exchange of Chupadero Black-on-white Pottery and Its Relationship to Social Identity*

Produced between AD 1150 and 1550, Chupadero Black-on-white pottery is found throughout central and southern New Mexico, and adjacent parts of Texas, Arizona, and Chihuahua, Mexico. Despite its widespread distribution, chemical and mineralogical compositional data indicate that the pottery was manufactured in only two areas of central New Mexico—the Jumanos portion of the Salinas province and Sierra Blanca region. Distributional studies indicate that the Chupadero pottery produced in the two regions exhibits substantially different patterns of exchange. The majority of vessels produced in the Salinas province were used in the Jumanos pueblos, with smaller numbers going to their Manzanos neighbors. In contrast, compositional data indicate that pottery from Sierra Blanca production sources extensively circulated through interregional exchange networks. This paper explores the differing patterns of interregional exchange as they relate to the social identity of consuming populations. The findings of this study suggest that Jumanos and Sierra Blanca populations may have used this ceramic as a broad social marker to differentiate themselves from neighboring Pueblo groups to the north and west. The common usage of Chupadero pottery as a social referent suggests that populations in both regions endowed these vessels with similar cultural meanings and values.

Clarke, Anne [100] see Donahue, Randolph

Clarke, Mary (Boston University), Franco Rossi (Boston University), Boris Beltran and William Saturno

[323] *Inequality and Gender in Spaces of Craft Production*

This paper explores questions of inequality and gender in the Classic Maya world by examining the spatial relationships between and within local sites of craft activity. Pulling from recent archaeological work at the Classic period site of Xultun, Guatemala, we present research on two contexts that were connected to the production and use of limestone and lime plaster. In presenting this work, we discuss the broader social implications of these spaces as they relate to class and gender through archaeological evidence discovered within and beyond zones of craft activity at Xultun. We draw on recent multi-scalar approaches to craft production implemented in other Mesoamerican contexts—spanning intrasite household workshops, distribution loci and final use contexts as well as broader macro-regional networks of trade and specialized production. We argue such analyses can foster a better understanding not only of operational sequences underpinning the production of limestone monuments and finished plaster objects at Xultun, but also of the social factors that contributed to the spatial arrangements of craft production and use in ancient Maya production contexts more broadly.

Clarkson, Persis B. [134] see Valenzuela, Daniela

Claunch, Skyler [11] see Fox, Jacqueline

Clayton, Sarah (University of Wisconsin-Madison)

[391] *Handmade or Mass-Produced: Ritual Objects and the Making of Identity in the Teotihuacán Region*

A hallmark of the material culture of Teotihuacán, the largest city of its time in Mesoamerica (ca. 1–600 CE), is the wide circulation of a variety of mass-produced goods, including objects used in household ritual. Items made from molds included masks, figurines, ceramic vessels, and decorative attachments to large incense burners, which are often found in domestic refuse and in ritual contexts such as burials. Although such artifacts appear alike, they were not uniformly distributed across the population, and variation in the selection and use of mass-produced objects was socially as well as economically significant. Handmade objects, such as the small incense burners called *candeleros*, were also key components of the material culture of household ritual. In this paper I explore patterns in the distribution and use of handcrafted and mass-produced objects that are encountered archaeologically as buried offerings. I consider the cultural significance of contrasting patterns among the urban neighborhoods of Teotihuacán and settlements beyond the city and discuss data resulting from current research at the site of Chicoloapan, in the southeastern Basin of Mexico.

Cleghorn, Naomi (University of Texas Arlington), Ximena Villagran (Museum of Archaeology and Ethnology/University of Cape Town), Daniel Peart (Ohio State University) and Hannah Keller

[153] *Hearth Features at Knysna Eastern Heads Cave 1, Southern Coast of South Africa*

The Agulhas Bank Paleoscape (ABP), a broad coastal plain that is now a submerged continental shelf off the south coast of Africa, would have presented early modern humans with a variety of potential foraging options. A rich Middle Stone Age record documents the presence of early coastal foragers as well as terrestrial hunter-gatherers in the ABP. At Knysna Eastern Heads Cave 1, both strategies are represented in a sequence spanning the end of the Middle Stone Age (about 40 ka) through to the end of the Last Glacial Maximum (about 19 ka), and through the technological transition to the Early Later Stone Age. Use of the cave throughout this period produced a dense sequence of well-preserved hearth features showing evidence of advance preparation of surfaces and frequent reuse. Here we report on the morphology, distribution, dating, and associated finds related to these features. Through an analysis of hearths, we investigate the issue of continuity of site use by groups with differing foraging strategies.

Cleghorn, Naomi [152] see Sender, Rachel

Clem, Shimaine, Emily A. Schach (Arizona State University) and Jane E. Buikstra (Arizona State University)

[233] *The Gendering of Children at Chiribaya Alta*

At the site of Chiribaya Alta (AD 900–1350), located in the Osmore Valley of southern Peru, certain Chiribaya grave goods are associated with either adult males or females. For example, females are often buried with weaving tools, and males with musical instruments. It is not possible to estimate the biological sex of children from their skeletal remains. Therefore, children are often excluded from studies addressing gender identities. Here, we use grave goods known to be associated with sexed adult remains to explore the process through which children learn their gender at Chiribaya Alta. Ethnohistoric and ethnographic data indicates that children begin to learn their gendered roles at a young age. The burial goods in the graves of the children at Chiribaya Alta help us to examine at what age and the process through which children begin to learn their expected adult gender roles and identities.

Cobb, Charles (Florida Museum of Natural History)

[395] *Indigenous Appropriations of Spanish Metal Goods in Southeastern North America*

Broadly speaking, iron and copper-alloy objects of Spanish origin in southeastern North America seem to fall into three categories that variably dominate from one site to another: 1) essentially unaltered, 2) trade goods modified by Europeans to conform to Native American demand; and 3) assemblages that consist of both categories 1 and 2, but were reworked by Native Americans. This diversity was a complex product of the convergence of structure, agency, and serendipity. The timing and nature of Spanish expeditions and settlements shaped the accessibility and even the value attached to objects, while Indigenous appropriations of those goods reflected local responses to novelty and opportunity.

[81] *Discussant*

Cobb, Allan and Linda Palit (Independent Researcher)

[386] *Leaving Their Mark on the Wall: Determining Sex in Ancient Maya Rock Art*

Handprints and stencils are ubiquitous elements in rock art throughout the world. Numerous well preserved examples have been noted in Maya caves. These elements provide a clue as to the sex of the person whose hand is recorded on the cave wall. Recent studies have shown that sex may be estimated with a high degree of accuracy using anthropometric hand measurements. Sex is estimated by applying a variety of mathematical models based on sexual dimorphism in hand dimensions to direct measurement from rock art elements. Measurements have been collected from hand-prints in a number of caves in Yucatán to provide a large database for this project. Sex determination from rock art elements may improve the understanding of gender roles of ancient Maya within the context of cave use.

Cobo, Jose M. [38] see Fort, Joaquim

Cochrane, Ethan (University of Auckland)

[180] *Selection-Driven Range Expansion Explains Lapita Colonization of Remote Oceania*

Archaeological explanations of colonization often focus on presumed human motivations. What drives humans when faced with the potentially risky and rewarding colonization of unoccupied island regions: curiosity, wanderlust, opportunity, escape? At best, human motivation is only a partial explanation for colonization and one that is difficult to evaluate with archaeological data. In contrast, archaeologically visible, population-scale patterns of human colonization are explicable by the natural and social environment, transmission and selection. This paper develops a range-expansion hypothesis from animal ecology and evolution to explain Lapita colonization of Remote Oceania. The hypothesis is tested with both archaeological data and simulation modeling.

Cockrell, Bryan [135] see Simmons, Scott

Coco, Emily

[283] *The Spatial Analysis of Debris from the Mound 34 Copper Workshop*

During the 2007–2009 excavations at Mound 34, Washington University students and Museum Society volunteers piece plotted each individual artifact associated with the copper workshop at this mound. This information allowed for an in-depth macroscopic analysis of the debris associated with this activity area. This analysis focused on the spatial analysis of the copper and other debris within the workshop. Distribution maps of the debris were created to determine the relationships between the different types of debris (i.e., the copper in relation to bone) and the relationship between the debris and structure. The distribution patterns identified by this analysis, in addition to comparisons with experimental copper-working, have led to important spatial and temporal insights into how copper items were produced at this site and how the structure of the workshop itself was being utilized.

Codding, Brian (University of Utah)

[383] *Ecology, Territoriality, and the Emergence of Acorn and Maize Economies in Western North America*

Ethnographic populations throughout Western North American sometimes relied on strategies and institutions to protect resources, patches, and territories for exclusive use. But explaining why and identifying when these exclusionary practices emerged (and dissolved) in the past remains difficult. Based on predictions from ecological and evolutionary theory, individuals should only engage in territorial behavior when the benefits of exclusive use, such as subsistence gains, are worth the costs of exclusionary tactics. We hypothesize this is likely to be the case when relatively dense populations shift toward intensified economies focused on abundant, storable, but relatively low profitability resources. If this is true, then demographic and economic shifts should occur coincident with changes in settlement patterns reflecting population infilling and stable clustering around key resources patches. Drawing on theoretical models from behavioral ecology and statistical models examining spatially explicit time series data, here we evaluate this hypothesis using two case studies: the emergence of acorn economies in central California, and the onset of maize agriculture in the eastern Great Basin and Colorado Plateau. If supported, this theoretical approach could help explain the origins of social institutions governing property rights, and this methodological approach could help identify such cases throughout prehistory.

[383] *Chair*

Codding, Brian [193] see Haisley, Christopher

Coe, Marion (Center for the Study of the First Americans, Texas A&M University)

[60] *Wild Plant Fiber Processing and Technological Organization: Holocene Perishable Artifact Production in the Bonneville Basin*

Perishable artifact analysis in the Great Basin has often focused on whole or complete pieces to address questions regarding broad social groupings and environmental adaptation. In the Great Basin, past populations targeted distinct ecological zones to tend and gather wild plant species for the manufacture of perishable material culture, and by focusing on technological organization and the manufacturing process, there is great potential to better understand how these activities contributed to organizing smaller-scale social groupings, social interaction, and environmental interaction in fragmentary artifacts. This presentation will provide an analysis of early through late Holocene Bonneville Basin museum perishable assemblages, and the Bonneville Estates Rockshelter and Four Siblings Rockshelter collections at Texas A&M University, including basketry, cordage, netting, snares, manufacturing debris, and other miscellaneous artifacts. Focusing on the technological organization and the manufacturing process, from initial wild plant fiber processing to artifact construction of sites around the Bonneville Basin, this analysis yields unique interpretations of Great Basin social and environmental interaction.

Coffey, Grant [301] see Schleher, Kari

Cohen, David (Researcher) and Monika Therrien (Director, Fundacion Erigaie)

[36] *Precarious and Obsolete Infrastructure: Archaeology of Water Networks in Bogota*

Infrastructure is currently one of the critical studies in social sciences at the global level, having been promoted as one of the great promises of equality and accessibility, through good performance and penetration of public services among the population, as well as a tool that would contribute to strengthen the control, authority and visibility of the State. The case study of the calle real of Bogota, being one of the oldest and most important streets in the city, makes visible what became the most prolific container space for the generation and installation of public and individual services of all times. Although data exists on these services in the documentary sources, archaeological evidences allowed us to contrast what is written with the quality and conditions of the infrastructure finally executed, particularly that related to water management. From stratigraphic, archaeometric, technological and urban analysis of the materials used to build water systems and their location along almost 2 km of this street, emerged as topical domains of discussion the precariousness and obsolescence of water networks under different political regimes and economic systems in the provision and maintenance of this service in Bogota.

Cohen, Jenny, Quentin Mackie (University of Victoria) and Daryl Fedje (University of Victoria)

[49] *Kilgii Gwaay: An Early Holocene Archaeological Wet Site in the Modern Intertidal Zone of Haida Gwaii, British Columbia*

The Kilgii Gwaay site in southernmost Haida Gwaii, British Columbia, is an early maritime-focused archaeological site dating to a brief interval about 10,700 cal. BP. The site was occupied at a time when relative sea levels were a few meters below modern and rising rapidly, ultimately drowning the site by up to 18 m of ocean waters for almost 10 millennia. Tectonic uplift over the past 5,000 years has gradually raised the site, which is now exposed in the intertidal zone. The overall assemblage suggests a summer base camp of people fully fluent in marine and terrestrial resources. Abundant stone tools and organic remains were recovered from excavations. Water saturation and site taphonomy at the site have preserved plant remains and bone, highlighting the importance of these otherwise relatively poorly preserved perishable resources from this early period. Wood artifact technologies and other plant use were established before the large-scale arrival of western redcedar (*Thuja plicata*), a cultural keystone species for Haida in more recent times. We contextualize the archaeobotanical, faunal and lithic assemblages, and discuss the implications of this wet site, one of the earliest of its kind in the Americas, for the early occupation of the Northwest Coast.

Cohen, Anna (University of Washington)

[322] *Advertising the Empire: Purépecha Strategies in the Imperial Heartland at Angamuco, Michoacán*

Regime change is a social process that has occurred throughout human history and yet much is still unknown about how political developments shape local communities. This paper examines the impacts of the Late Postclassic (1350–1530 CE) Purépecha Empire on residents at Angamuco, an ancient city within the Lake Pátzcuaro Basin imperial heartland in Michoacán, Mexico. Imperial narratives in ethnohistoric texts emphasize that authorities

controlled craft production, tribute, and social practices. Archaeologists have investigated these narratives within a social evolutionary framework that underscores an expanding and highly centralized Purépecha state and empire. Drawing upon material from excavation and survey of domestic and public ritual contexts, I evaluate whether the dominant top-down model of political economic consolidation has more explanatory power than alternative bottom-up models. Changes in the production and use of the ceramic artifacts, as well as differences in stone architecture, suggest that the Purépecha exploited existing resource systems, and that imperial changes are most visible in elite areas of Angamuco. The results of this study provide a foundational chronology of occupation at Angamuco and add to our knowledge of complexity and urban forms in western Mexico.

Cohen, Anna [118] see Solinis-Casparius, Rodrigo

Cojti-Ren, Iyaxel (Vanderbilt University)

[218] *The Emergence of the Kaqchikel Polity: Ethnogenesis in the Postclassic Guatemalan Highlands*

In this paper I will explore how the western Kaqchikel managed from being military auxiliaries to the K'iche' kingdom to become an independent and expansionist polity, and how this transition was reflected in the material culture of their two last settlements. I will use ethnohistorical documentation to inform how the western Kaqchikel conceived their auto determination, and how they reached it after they abandoned their first capital Chi Awar after breaking their political alliances with the K'iche' to start a new chapter of their sociopolitical life as an independent polity at Iximche. Archaeological data will be presented to corroborate ethnohistorical information regarding the Kaqchikel occupation of Chi Awar, the drastic abandonment of this site, and specially to discuss how the material culture let us know better about the lifestyle the Kaqchikel had at Chi Awar as an emerging polity but still under the dominance of the K'iche'. This research intends to be a diachronic study about the inception of a new political community in the highlands of Guatemala and to enrich the discussion about the Mesoamerica's political geography in late Postclassic Mesoamerica.

Colburn, Mona [61] see Styles, Bonnie

Colclasure, Cayla (University of Tennessee, Knoxville), Martin Walker (University of Tennessee, Knoxville) and David Anderson (University of Tennessee, Knoxville)

[241] *Defining the Local Experience: A Distributional Analysis of Late Prehistoric Activities at the Topper Site (38AL23)*

During the summers of 2015 and 2016, University of Tennessee, Knoxville field schools conducted excavations on the hillside at the Topper Site (38AL23), in Allendale, South Carolina. This work represents a shifting focus away from the Paleoindian period toward the dense Mississippian and Woodland assemblages present at the site. Maps constructed utilizing QGIS document the distribution of artifacts and the arrangement of identified features in the two excavation blocks and dispersed 1 × 1 m units. Evidence for habitation includes hearth features as well as linear and semicircular arrangements of postholes. The distributional analysis examines utilization of space within and without the structure and determines activity areas. These distributions were compared to similar datasets from other locations, including the Woodland occupation at the G.S. Lewis West site, located approximately 30 km north along the Savannah River. Site function and broader relationships to contemporary, local communities are considered. We discuss what aspects of daily life and household dynamics are reflected in our findings. This paper provides insights into intrasite activity patterning at Topper, local settlement variation in the Savannah River Valley, and contributes to our knowledge of the Woodland period on the Southeastern Atlantic Slope.

Cole, Emily [132] see Simpson, Bethany

Cole, Kasey (Dept. of Anthropology, California State University) and Frank Bayham (Department of Anthropology, California State University)

[251] *Artiodactyl Exploitation in Northeastern California during the Terminal Prehistoric/Protohistoric Time Periods: Evidence of Environmental Rebound?*

Artiodactyl representation in the archaeological record can be a particularly sensitive indicator of past human-environmental interactions due to their status as a high-ranking prey item. In this study we explore terminal prehistoric and protohistoric patterning of artiodactyl exploitation in the archaeofaunal record in northeastern California. Specifically, this study examines previously published zooarchaeological data derived from residential sites situated along the Pit River in conjunction with new data derived from the faunal analysis of the Lorenzen site (CA-MOD-250), a residential village occupation located north of the Pit River drainage in Little Hot Springs Valley, California. The examination and comparison of artiodactyl exploitation during this time period and in these nearby localities provides some evidence for environmental rebound within the region. Additionally, this study explores factors that might influence both temporal and spatial variation in this phenomenon as a whole.

Collard, Mark (Simon Fraser University), Ben Raffield (Simon Fraser University) and Neil Price (Uppsala University)

[15] *Religious Belief and Cooperation in Viking Societies*

It has become clear in recent years that it was not uncommon for Viking groups to be heterogeneous. Numerous studies carried out over the last 25 years indicate that, in the short term at least, sociocultural diversity has a negative impact on trust within communities, and that this leads to a reduction in the willingness of community members to support public projects. Thus, one issue raised by the discovery that many Viking groups were heterogeneous is how loyalty to the group was achieved. In the present paper, we seek to shed some light on this question. Recent work in the field known as the Cognitive Science of Religion suggests that certain religious beliefs can reduce selfishness and enhance within-group cooperation. Supernatural monitoring—wherein deities observe human thoughts and actions in order to identify and punish those who fail to act prosocially—is thought to be particularly important in this regard. With this in mind, we review archaeological data and written sources to address the question “did Norse gods engage in supernatural monitoring?” We show that there is reason to believe that the Norse gods were perceived to monitor human thoughts and actions and that this likely promoted a parochial form of prosociality.

Collard, Mark [77] see Carleton, William

Collins, Benjamin (University of Manitoba) and Christopher Ames (University of Victoria)

[146] *Preliminary Results from New Excavations of the Late Pleistocene Occupations at Grassridge Rockshelter, South Africa*

Grassridge Rockshelter sits at the base of the Stormberg Mountains in the northern part of the Eastern Cape, South Africa. This region has only been the focus of two previous major archaeological projects, with research at Grassridge last conducted in 1979 and identifying Holocene Later Stone Age and Late Pleistocene Middle Stone Age occupations. The Grassridge Archaeological and Palaeoenvironmental Project (GAPP) renewed research at Grassridge in 2014. In this presentation, we summarize the results of the new excavations, with a focus on the Late Pleistocene occupation. Major

findings include a rich lithic assemblage with abundant points and blades, frequent and overlapping burning features, ochre, fauna, and preserved plant remains. A radiocarbon date of $35,000 \pm 2200$ 14C years BP places Grassridge's upper Late Pleistocene occupation during a period of region-wide behavioral and technological diversity in southern Africa. GAPP's ongoing research of Grassridge's rich Late Pleistocene archive looks to contribute to a better understanding of this diversity in relation to the paleoenvironmental, demographic, and social influences during this period.

Collins, Brennan [18] see Glover, Jeffrey B.

Collins, Renee (Northern Arizona University) and Rafael Guerra (University of New Mexico)

[298] *In the Shadow of the Giant: Investigating the Rise and Fall of Settlement Groups Adjacent to Site Cores in the Belize Valley*

Located directly across the Belize River from Barton Ramie, the recently discovered site of Lower Dover has been the focus of intensive research by the BVAR Project since 2011. The major foci of these investigations are to determine the relationship between Lower Dover, Blackman Eddy and Baking Pot, and to ascertain the development of the site within the sociopolitical landscape of the Belize River Valley region. In an effort to address the latter research questions, excavations have focused on both the monumental architecture of the site core, and on plazuela groups in the immediate periphery of the site's epicenter. One of these peripheral settlements, designated as Group G, consists of five mounds that enclose a small plaza just north of the center's ball court. This paper presents preliminary results of our investigations on Group G, and compares the development of this settlement with that of the site center.

Collins, Ryan (Brandeis University)

[329] *Monumental Recycling: The Inevitably Perilous Relationship between Shifting Integrative Strategies and Yaxuná's E-Group Plaza (900 BCE to 100 CE)*

Over four consecutive field seasons, the Proyecto de Interacción Política del Centro de Yucatán investigated the plaza and several buildings in Yaxuná's E-Group, granting new insight into the site's origins and development from a modest ceremonial complex into a monumental urban center. Excavations over the east-west centerline of the plaza generated data on several distinct commemorative events spanning 11 floor phases. Nonetheless, each of the observed traditions is fraught with continuities and disjuncture's between phases that I argue marked distinct strategies for fixing identities, fostering community wide integration over generations. Furthermore, the shifts in commemorative traditions coincide with gradual developments in sociopolitical complexity and increased stratification apparent throughout Eastern Mesoamerica between 1000 BCE and 100 CE. Although the E-Group was a nexus where experiences, identities, and memories were repeatedly fixed, after 350 BCE commemorations and architectural campaigns became distanced. Though Yaxuná remained occupied, further constructions and visible activities in the E-Group came to a gradual halt, shifting the former politico-religious importance of the space to that of a resource for masonry stones. This paper will explore how monuments serve to foster social integration between groups as well as fractures.

[329] Chair

Colonese, Andre Carlo (University of York), Cecile Brugere (Stockholm Environment Institute, University of York), Rafael Brandi (Brandi & Bandeira Consultoria Cultural), Arkley Bandeira (Brandi & Bandeira Consultoria Cultural) and Alpina Begossi (Capesca/Lepac and CMU, UNICAMP, UNISANTA, FIFO)

[45] *Shifting the Paradigm of Coastal Archaeology in Latin America*

How might knowledge of past fisheries contribute to the future sustainability of modern coastal societies? Small-scale coastal fisheries provide a crucial source of food and livelihood to millions of people living in South America. Such coastal economies are founded on long-established knowledge that is deeply rooted in the past. While marine conservation, dwindling fish stocks and environmental sustainability have driven the research agenda in recent years, government and international organizations are now emphasizing the pivotal role of local traditional knowledge for promoting sustainable development and poverty eradication in coastal areas of developing and developed countries. If traditional subsistence strategies are to be of value in promoting sustainable fisheries and coastal livelihoods in the future, a deeper understanding of their long-term history is required. We will present the results of a multidisciplinary research effort aimed at exploring and documenting the contribution of coastal archaeology to pressing issues in modern Latin America. We will demonstrate how coastal cultural heritage and traditional knowledge contribute to community livelihood and poverty mitigation in one of the poorest areas of Brazil. Coastal archaeology can effectively track the legacy of past fisheries to the socioeconomic and cultural profile of contemporary societies.

[45] Chair

Colonese, Andre Carlo [96] see Hendy, Jessica

Colten, Roger (Peabody Museum of Natural History, Yale University), Susan deFrance (University of Florida), Michelle LeFebvre (University of Florida) and Brian Worthington (National Park Service, Southeast Archeological Cen)

[340] *Were Hutia Domesticated in the Caribbean?*

The Caribbean islands had limited endemic terrestrial fauna and they lacked any of the New World domesticated animals until fairly late in prehistory. Given the depauperate terrestrial fauna of these islands the early Native American inhabitants relied on marine resources and endemic rodents for a significant proportion of the animals in their diet. It has been argued that rodents from the family Capromyidae, various species of hutia, were managed and perhaps domesticated in the Caribbean. In this paper we review literature on the prehistoric management of hutia and present archaeological faunal data from Cuba dating to the preceramic era and faunal data from later time periods from the Bahamas.

Coltman, Jeremy (University of California, Riverside)

[119] *Climbing the Home of the Rain Gods: Mountain Cults in Ancient Central Mexico*

According to Henry B. Nicholson, the rain deity Tlaloc enjoyed the most active and widespread cult in ancient Mexico. This assertion is surely correct, and is further evidenced from later ethnohistoric and ethnographic sources. Closely related to Tlaloc—and his earlier manifestations—were the Tepictoton, little directional mountain deities venerated during the veintenas of Tepeilhuitl and Atemoztli. In this paper we review Nicholson's original observations seen in the light of new discoveries and interpretations of the past 25 years. We will thus look at the significance and symbolism of mountain cults in ancient Central Mexico from the Classic period and onward, examining some of the regional and temporal variations of what was clearly a shared set of ideas and beliefs. Both Teotihuacán and Mexico-Tenochtitlan sit in the shadow of important mountains that had ritual significance. Most likely, the very position of these mountains had something to do with the settlement of these centers as part of rituals of foundation.

[119] Chair

Coltrain, Joan [290] see Lewis, Michael D.

Colvin, Matt [163] see Thompson, Victor

Cometa, Kaitlyn and Allen Denoyer (Archaeology Southwest)

[303] *The Value and Availability of Quality Obsidian at Antelope Creek*

Antelope Creek is a part of the important larger obsidian source at Mule Creek in Southwestern New Mexico. Antelope Creek contains an abundance of both poor and good quality obsidian that appears to have developed from the same volcanic event. In this experiment, a large sample of Antelope Creek obsidian was collected and tested for quality through the process of flintknapping. Results indicate that knappers can readily tell a poor quality nodule from a good quality nodule from this source by the appearance of the cortex. The good quality, valuable obsidian nodules have a matte brown cortex whereas the cortex of the poor quality obsidian nodules appears polished and black. We also examine the formation processes and chemical makeup of these nodules that could have resulted in varying cortex properties as well as varying knapping quality and the ability to drive valuable flakes from a core.

Commendador, Amy S. (Idaho Museum of Natural History), John Dudgeon (Idaho State University), Rebecca Hazard (Idaho State University) and Julie Field (Ohio State University)

[123] *Multicomponent Analyses of Prehistoric Fijian Diet: Stable Isotopes of Bone Collagen and Carbonate*

Several studies have provided stable isotopic insights into prehistoric Fijian diet via carbon and nitrogen analyses of bone collagen, with recent reports suggesting a diet of predominantly C3 plants though with some individuals exhibiting significant input from lower trophic level marine resources. Here we add to these studies by incorporating both a larger sample size from several sites on Viti Levu and a combined analysis of isotope data obtained from human bone collagen and carbonate. The combined analyses of collagen and carbonate may provide a more accurate understanding of prehistoric subsistence, as collagen represents primarily protein intake while carbonates have been shown to record whole diet and may enhance our understanding of the incorporation of low protein sources. While bone carbonate data has the potential to clarify input from low protein sources, this matrix is more susceptible to diagenetic alteration. We also present ATR-FTIR analyses of all bone samples to understand potential diagenetic signatures and validate carbonate isotopic data. Lastly, prehistoric diet will be examined in light of a modern isotopic food web being developed for Viti Levu.

Commendador, Amy S. [123] see Dudgeon, John

Commendador, Amy S. [123] see Field, Julie

Commendador, Amy S. [123] see Franklin, Olivia

Compton, Mary (University of Western Ontario)

[258] *Making Meaning from 3D Models and 3D Prints: A Case Study Using Archaeological Objects from Southwestern Ontario*

3D technologies provide a powerful mechanism for documenting, sharing, and engaging with archaeological information. While the products of these tools (including 3D models and 3D prints) are often treated as neutral objects, they should be identified as mediated and interpretive entities. How people experience, perceive, and value these archaeological "copies" in relation to original archaeological material is still relatively unknown. This poster provides a localized case study from Southwestern Ontario outlining the key themes that emerged from interviews with diverse archaeological constituents including local descendant (First Nations) community members, academic and CRM archaeologists, museologists, and members of the general public. The interviews were framed around a collection of both historical Euro-Canadian and Ontario First Nations artifacts as well as digital photographs, 3D models, and 3D prints of those artifacts. Along with a brief description of the various technologies used to make the representations and replicas, this poster synthesizes the key themes emerging from the interviews and discusses the implications of those results for the development of future artifact sharing protocols.

Comstock, Aaron (Ohio State University) and Robert Cook (Ohio State University)

[299] *Migration and Cultural Emplacement on the Mississippian Periphery: A Fort Ancient Example*

Recent excavations at the Turpin site (33HA19) in southwest Ohio, have reestablished the importance of population movement in cultural emplacement in this region. Although the predominant model for Fort Ancient evolution in the Middle Ohio Valley posits gradual village development and relatively late (post-AD 1400) Mississippian influence, work at Turpin and other sites in the lower Miami Valleys suggests that the movement of Mississippian people acted as a catalyst for change beginning around AD 1050–1100. The focus of this presentation is on results from recent excavation and analysis of assemblages from two wall trench structures. Chronological and material culture data suggest that early occupation (AD 1030–1200) of Turpin is consistent with Mississippian villages throughout the Midwest and Southeast. Later occupation (AD 1200–1275) at Turpin is more consistent with more "typical" Fort Ancient sites in the region. The largest implication of these findings is that Mississippian involvement was seminal in the development of Fort Ancient culture rather than epiphenomenal.

Conard, Nicholas (University of Tübingen)

[389] *Examining Sedimentation Rates, Find Densities, Raw Material Economies and Technological Solutions in Paleolithic Contexts*

This paper examines low density Paleolithic sites from several geological contexts within a diachronic framework. The case studies consider what unifying elements and differences exist in Lower, Middle and Upper Paleolithic contexts and addresses their causes with regard to the nature of sedimentation, raw material availability and technological needs. Where preservation permits links will be made between assemblages of lithic, faunal and botanical artifacts at the contexts studied to help interpret the functional importance of low density accumulations, which often, but not always, reflect brief and ephemeral occupations.

[165] *Discussant*

Conard, Nicholas [282] see Velliky, Elizabeth

Conesa, Francesc C. (Spanish National Research Council—Universitat Pompeu Fabra)**[57]** *Looking for Green Grass in the Desert: Methods for Land-Cover Classification in Drylands*

In recent years, applications of Earth Observation for archaeology have been boosted by data acquisition and by the increased spatial and temporal resolution of new products (e.g., Sentinel-2, WorldView series, Pléiades mission). Nowadays, archaeologists are looking for ways to effectively merge multi-spatial and multi-temporal imagery, integrating spectral and contextual information as well. In arid lands, the lack of adequate data on long-term vegetation dynamics is hampering our capacity of understanding human-environment interactions. In this paper we present an ongoing research aimed at refine the land cover classification of the archaeological landscapes of Central Sahara and Gujarat (South Asia). Those areas where not subjected to major environmental changes throughout the late Holocene, and thus represent ideal case studies to apply remotely sensed based approaches. The understanding of the land cover dynamics in arid lands is key to refine our reconstruction of past cultural trajectories. In doing this, we are exploring a set of different approaches in land-cover classification (e.g., spectral ratios, LDA, image segmentation and OBIA) in open-source platforms (i.e., R, OTB) in order to get automatic and accurate results from multiple datasets.

[57] *Chair*

Conesa, Francesc C. [57] see Biagetti, Stefano

Cong, Dexin (Institute of Archaeology, Chinese Academy of Social Sciences, Beijing, China)**[117]** *Silk Road and Archaeology in Xinjiang: Insight from Adunqiaolu*

The "Silk Road" describes the cultural communication routes established in the Han and Tang Dynasties. The term, coined by German scholar Richthofen (李希霍芬) in the historic literature, has since spread globally. The Xinjiang Uygur Autonomous Region in China, located in the line of communication between East and West, was part of the Western Region in Chinese historic literature. Because of the unique climate conditions of Xinjiang, preservation of ancient remains is excellent, providing a rich array of materials for exploring ancient cultures of the Western Region. This study examines human remains from the Bronze Age site of Adunqiaolu through aDNA, stable isotopic, and paleobotanic analyses. In addition, the bioarchaeological and archaeological data have been combined with extensive historic literature to investigate ancient human behavior, cultural exchanges, and lifeways that culminated in the formation of the "Silk Road." This multidisciplinary approach applied to the complex history of Xinjiang from prehistoric to Bronze Age times facilitates a growing understanding of the Silk Road and the people of this vast trading and cultural exchange network.

Cong, Dexin [115] see Wang, Minghui

Conkey, Margaret (UC-Berkeley)**[172]** *Field Walking and Walking the Field*

While we have gradually accepted that archaeological survey is as integral to our research as the overly-valued practice of excavation, the emotional dimensions of survey where one connects with the landscapes and with its occupants are hardly discussed, especially in the case of long-term surveys. What does a heart-centered survey project look like? How does the intimacy that comes from field walking inform the archaeology? As well, we are all participants in the field of archaeology, and everyone has a personal trajectory; we are walking the field over the years. Some of us have chosen to do this with as much collaboration as possible, as a way to bring more to the process, to recognize that walking (through) the field is a social, personal, emotional and intimate process that should be validated and endorsed. In this presentation, I will address both sides of "the field" from a heart-centered perspective drawing, on one hand, from my own field walking survey project in the French Midi-Pyrénées and, on the other hand, from the collaborative practices that have allowed me to walk through our disciplinary field.

[65] *Discussant***Conlee, Christina (Texas State University)****[147]** *Moderator*

Conlogue, Gerald [151] see Tarquinio, Daniella

Connaway, John [163] see Johnson, Jay

Connell, Samuel (Foothill College), Rachel Brody (Boston College), Andrew Bair (Columbia University), Lena Murphy (Mendocino College) and Valerie Watson (University of Wisconsin-La Crosse)**[282]** *Castles in Communities Anthropology Settlement Survey: Preliminary data from 2015/2016 Field Seasons at Ballintober, Ireland*

An overview of project design and preliminary results from two field seasons of research aimed at expanding our understanding of settlement in later medieval Ireland. The field school program run by Foothill College at Ballintober Castle in Co. Roscommon has made remarkable progress 1) identifying possible phases of Anglo-Norman and subsequent Gaelic Irish castle construction and occupation, 2) utilizing different geophysical techniques to find a Deserted Village associated with the castle, and 3) building community heritage plans.

Connell, Samuel [220] see Boyd, Siobhan

Connuaghton, Sean [394] see Herbert, James

Conrad, Cyler N. (University of New Mexico)**[333]** *From Hunting and Gathering to Farming in Northern Thailand*

Southeast Asia's prehistoric zooarchaeological record is peculiar: faunal assemblages are seemingly 'diverse,' and generally include a large number of mammalian/reptilian/avian and molluscan species, but often these assemblages lack telltale evidence for human consumption. Therefore, one of the primary challenges confronting zooarchaeologists in this region is identifying what taxa were actually exploited by prehistoric foragers and how these patterns changed over time. This paper investigates forager subsistence in northern Thailand over the past 12,000 years. Using new zooarchaeological evidence from Tham Phii Man (Spirit Cave), Tham Phaa Can (Steep Cliff Cave), Tham Sai (Banyan Valley Cave) and Non Nok Tha (Partridge Mound), I

argue that prehistoric hunter-gatherers only exploited some species present in these faunal assemblages and that this pattern of exploitation shifts in the early to mid-Holocene. These new datasets show that the transition from hunting and gathering to farming in mainland Southeast Asia was complex and requires an explanation of in situ foraging adaptations to understand why it was successful.

[333] Chair

Conrad, Cyler N. [127] see Bowler, Victoria

Contreras, Daniel (Aix-Marseille Université)

[37] *Downscaling in Archaeology: From digital forest to probable trees*

Integrating archaeological and paleoenvironmental data about the past is a long-standing archaeological goal. It is often central to basic archaeological interpretation, fundamental to addressing questions of human-environment interaction, and vital to realizing archaeology's potential contributions to studies of vulnerability, resilience, and sustainability in the face of climate change. However, such integration faces challenges of scale, resolution, and mechanism. Increasingly abundant digital data open the possibility of adoption of statistical downscaling approaches used in ecology and paleoclimatology, which offers one means of addressing these challenges. In this paper I use a case study in Provence (France) as an example of the downscaling of paleoclimate data to explore the human consequences of Holocene climate change, particularly through its impacts on agricultural potential. The promises and pitfalls of downscaling in archaeology, I argue, exemplify the potentials of digital data: downscaling enables generation of interpretive possibilities, but also risks reifying one of them by producing seductive results. At the same time, downscaling is so explicit in its probabilistic foundations that it is a useful epistemological metaphor for digital archaeological data more generally.

[112] Discussant

Contreras, Daniel [90] see Feathers, James

Conway, Meagan [207] see Ames, Nicholas

Conyers, Lawrence [350] see Monaco-Schlater, Joanna

Cook, Anita (Catholic University of America)

[65] Discussant

Cook, Katherine and Meghan Burchell (Memorial University of Newfoundland)

[18] *Teaching Digital Archaeology as Public Anthropology: Models for Using Social Media and Technology to Move Beyond the Classroom*

Higher education pedagogy and university administration are pushing technologies as a way of increasing engagement and contact with students, rolling out digital learning environments and handheld devices aplenty. This shift has been critiqued as a fad but can it be harnessed to address the long-standing goals of public anthropology and calls to decolonize the classroom? Embracing multivocality, diversity, inclusivity and collaboration is complex, and opportunities to teach in a way that moves beyond simply lip service are rare. However, the tools to begin training students in public anthropology are often already at their fingertips—in fact, many of them are already doing it. By integrating technologies and social media thoughtfully and critically into curriculum, we can contribute to better understandings, approaches and skills for future generations of anthropologists. Digital literacy training as part of degree programs can also be harnessed in pursuit of increasing accountability, ethical practice, civic engagement, and global consciousness on the part of students and instructors alike to frame sustainable relationships outside of the classroom. Based on experiences teaching undergraduate and graduate students in North America and Europe, this presentation will share successes, failures, and lessons in digital public archaeology that our students have taught us.

[372] Discussant

Cook, Robert (Ohio State University) and Mark Schurr (University of Notre Dame)

[341] *Using Fluoride Analysis and Artifact Density to Examine Household Formation in Prehistoric Villages: A Fort Ancient Example*

Examining the formation histories of houses within prehistoric villages is difficult in cases with coarse resolution of radiocarbon dates and lack of stratigraphic relationships. Here we examine this problem by using two relative dating techniques, accumulation studies of artifacts and fluoride dating of animal bone, at the Guard site, an early (ca., AD 1000–1300) Fort Ancient village located in southeast Indiana. The sampling strategy involved excavating test units in all houses to assess the depositional history of the individual basins and to determine a relative sequence of house construction within the village. Results reveal much variation in artifact accumulation between houses, with houses containing more artifacts being hypothesized to be older structures that had been filled in with trash. Fluoride analysis was used to examine this hypothesis, producing generally consistent results. Vertical considerations revealed that stratigraphy was often reversed which is consistent with the interpretation that they were rapidly filled with trash. Horizontal considerations indicate that the initial construction age of houses with more trash were generally earlier than those with less trash.

Cook, Robert [299] see Comstock, Aaron

Cook Hale, Jessica (University of Georgia), Nathan Hale (University of Georgia) and Ervan Garrison (University of Georgia)

[199] *The Tempest: Geoarchaeological Investigations into the Effects of a Hurricane on a Submerged Prehistoric Archaeological Site, Apalachee Bay, Florida, USA*

When Hurricane Hermine made landfall approximately 5 miles southeast of St. Mark's, Florida, on September 1, 2016, it passed directly over several known submerged prehistoric archaeological sites in Apalachee Bay. This was less than one month after we had completed geoarchaeological investigations at one of them, the Econfina Channel Site, 8Ta139. The passage of the hurricane has allowed us a unique opportunity to assess what, if any, effects the storm had on the site. This study is particularly relevant because the nature of preservation at submerged prehistoric sites varies depending on multiple factors, many of which cannot be properly constrained. In this case, we have sedimentological datasets from prior to the storm. These will be compared to sedimentological datasets collected after, as well as any other observed changes in site features, artifacts, or overall geomorphological context.

[199] Chair

Cooley, Delaney (University of Oklahoma)

[343] *A Comparison of the Lithic Assemblages from the Shavano Springs site (5MN40) and Christmas Rockshelter (5DT2), Western Colorado*
Archaeologists have long struggled to identify archaeological material diagnostic of prehistoric and protohistoric Ute occupation in the Rocky Mountains and surrounding areas. Despite continued efforts, researchers continue to rely principally on William Buckles's (1971) seminal work examining Ute cultural continuity on the Uncompahgre Plateau of western Colorado. My research expands on Buckles' 45 year-old dissertation by reexamining two excavated sites from his project: the open occupation Shavano Springs site (5MN40) and Christmas Rockshelter (5DT2). Together, the two sites chronologically encompass the Paleoindian period through historic times. I will compare the lithic procurement and production strategies through time and between the two sites, for levels of comparable antiquity, to characterize the degree of continuity or lack thereof. My results identify aspects of lithic technology unique to prehistoric and protohistoric Ute and provide researchers with new tools for evaluating the cultural affiliation of prospective Ute sites.

Cooney, Gabriel (UCD School of Archaeology), Jenny Murray (Shetland Museum and Archives) and Will Megarry (Queen's University Belfast)

[216] *Powerful Objects: Traditional Beliefs about Neolithic Axes and Knives in Shetland*
In the Shetland islands off the north coast of Scotland there was major exploitation of a lithic source known as riebeckite felsite during the Neolithic period. This source provided the raw material for the majority of stone axes known from the archipelago and also for objects known as Shetland knives. At the source, North Roe, mainland Shetland intrusive dykes of felsite occur in granite. Integrated, multi-scalar survey and excavation by the North Roe Felsite Project has demonstrated that some of these were worked extensively. Objects from the quarry complex have been found right across the island group. Museum records and oral accounts indicate that traditionally felsite axes in particular were regarded as powerful objects, often deliberately incorporated into the walls of buildings and actively employed in practices to bring good luck to the family and farm. This paper will explore the basis for this active social role of felsite objects and raise the question of the extent of local knowledge of the quarry which was archaeologically identified within the last fifty years.

Cooney, Gabriel [376] see Megarry, Will

Cooper, Catherine G. (University of British Columbia), Angela Perri (Max Planck Institute for Evolutionary Anthropology), Jessica L. Burns (University of Utah), Jeremy M. Koster (University of Cincinnati) and Michael P. Richards (Simon Fraser University)

[156] *Dietary Variability through Isotopic Analysis of Modern Human Hair from Nicaragua: Exploring Significant Differences in Diet between and among Demographic Groups in a Single Population*
Carbon and nitrogen stable isotope analysis of modern human hair from Nicaragua was used to explore what constitutes significant differences in gross diet between and among demographic groups within the same population. Our results show that the absolute differences between isotopic central tendencies of demographic groups are small, but some are significant. Socioeconomic categories that were found to have significantly different isotopic signatures between or among groups included age groups ($\delta^{13}\text{C}$ $X^2 = 76.99$, $df = 4$, $p = 0.000$ and $\delta^{15}\text{N}$ $X^2 = 86.85$, $df = 4$, $p = 0.000$), locations ($\delta^{13}\text{C}$ Mann Whitney U = 5992.000, $p = 0.000$ and $\delta^{15}\text{N}$ Mann Whitney U = 8926.000, $p = 0.021$), and wealth (mean $\delta^{15}\text{N}$ Mann Whitney U = 122.000, $p = 0.003$); there were no significant differences in isotopic signature between sexes.

Cooper, H. Kory (Purdue University), Robert J. Speakman (University of Georgia), Antonio Simonetti (Notre Dame), Matthew Pike (Purdue University) and Garrett Hunt (Purdue University)

[4] *Native Copper Innovation in the North*
Native copper occurs in the Northwest Coast, western Subarctic, and Central Canadian Arctic and Subarctic. In all three regions there is archaeological evidence for its use by Hunter-Gatherers before the Contact Period. Since 2011, our project has been studying the innovation of native copper metallurgy in these three regions within a Behavioral Archaeology framework using data collected from: experimental archaeology, oral history, lead isotope analysis, research on museum collections using pXRF, government archaeological site databases, and gray literature. This project also has a community component, collaborating with the Native Alaskan and First Nations communities. Although the results of Pb isotope analysis of geological samples of copper from the Arctic and Subarctic are not encouraging, the large set of pXRF data suggests that this technique can be used to distinguish native copper from alloys such as brass and leaded materials and also relatively pure smelted copper. Additionally, this paper provides a brief overview of our results to date including a comparison of the use of copper by Hunter-Gatherers exhibiting differences in social complexity as well as thoughts on why and how copper innovation occurred in all three regions.

Cooper, Jago (British Museum)

[93] *Discussant*

Cooper, Jago [133] see Samson, Alice

Cootsona, Melanie (Barnard College) and Madeleine Strait (Barnard College)

[192] *The Animals of Pueblo Ritual: Faunal Analysis of a Kiva from Pot Creek Pueblo, New Mexico*
This poster reports on the analysis of the faunal remains from a D-shaped kiva in use during the late 1200s or early 1300s at Pot Creek Pueblo in the northern Rio Grande region of New Mexico. The kiva was decommissioned in a highly ceremonial manner with both human and animal interments, as well as a variety of additional animal offerings on the floor. Additional animal deposits in the fill of the kiva suggest the continued use of the space as a receptacle for offerings. Close analysis of these zooarchaeological remains thus provides a key means of exploring the ritual practices of Ancestral Pueblo communities in the Rio Grande during a period of active village aggregation and social transformation.

Copeland, Lauren (California State University, Los Angeles)

[11] *The Iconography of a Late Classic Polychrome Maya Vessel from Petén, Guatemala*

While elite Maya polychrome ceramics often contain images and inscriptions related to political actors, motifs on the majority of polychrome ceramics relate to important elements of ancient Maya cosmology. This poster analyzes the iconography on a Classic Maya polychrome vessel from Petén, Guatemala, donated to the San Bernardino County Museum. The central figure on the interior of the bowl is a deer and a supernatural figure is painted on the inside wall. Terrestrial motifs are found on both the interior and exterior, emphasizing the centrality of the animate Earth.

Copeland, Sandi (Los Alamos National Laboratory), Amanda White (Los Alamos National Laboratory), Samuel Loftin (Los Alamos National Laboratory), Leslie Hansen (Los Alamos National Laboratory) and Benjamin Sutter (Los Alamos National Laboratory)

[366] *Modeling Erosion Risks for Archaeological Sites in the American Southwest Using GIS and RUSLE (Revised Universal Soil Loss Equation)*
The greatest climate change related threat to archaeological sites in the American Southwest is soil erosion brought on by hotter temperatures, increasingly intense wildfires, bark beetle infestations, and other subsequent changes in habitats. At Los Alamos National Laboratory in northern New Mexico, we manage 38 square miles of canyons and mesas that contain more than 1,700 archaeological sites, most of which are affiliated with Ancestral Pueblo cultures. In order to identify and protect the sites at highest risk for erosion, we created a soil erosion model using a geographic information system (GIS) and the revised universal soil loss equation (RUSLE). The model combines GIS layers that reflect climate, soil types, land cover, and LIDAR-based topography with a 2-m-square resolution. The model estimates tons of soil eroded per acre per year, but is best interpreted as a relative measure in this initial application. At Los Alamos National Laboratory, the model successfully identifies sites with threatening erosional issues, such as small gullies within the boundaries of mesa-top pueblo room blocks, and shows promise for use as a tool for comparing areas of greatest erosional concern across the Laboratory.

Coppe, Justin (Tracéolab-University of Liège), Veerle Rots (Tracéolab-University of Liège), Marc Pirlot (ABAL-Royal Military School of Belgium) and Valérien Clarenne (Royal Military School of Belgium)

[40] *The Ballistic Performance of Prehistoric Weapons: First Results of a Comparative Study*

Projectile points have recently taken a prominent position in debates on the complexity of Paleolithic human behavior. While the appearance of hunting weapons in the archaeological record was a central element in early discussions, the debate has shifted toward the appearance of specific projecting modes. Given that the organic propulsion tools (bow, spear-thrower) are only rarely preserved, energy has been invested in experiments to explore how the projecting mode can be identified based on the analysis of stone points. These experiments usually attempt to control selected parameters in projectile use (e.g., speed, target, angle of impact), but the ballistic parameters that are used are generally based on heterogeneous and not commonly reported studies. Little research has focused on the measurement of the complete ballistic performance of prehistoric weapons. We present the first results of a systematic ballistic study that quantifies and compares different modes of propulsion.

Corbett, Debra [194] see Funk, Caroline

Corbett, Jack (Portland State University) and Nelly Robles Garcia (National Institute of Anthropology and History)

[200] *Más Allá de la Arqueología*

Archaeological research frequently produces material elements we seek to safeguard for the benefit of future generations, a goal that requires organizational support and a mix of resources. When the research materials pass to the responsibility of communities or groups with limited preparation and resources for management of said materials, we encounter a serious disconnect between the accomplishments of research and the long-term viability of archaeological resources. In Mexico the long monopoly of the National Institute of Anthropology and History is being eroded as community museums or other entities seek more control over archaeological materials. Yet the organizational frameworks, resource base, and capacity for continuity of such entities remain in question. This paper explores the capacity for sustainable management of cultural heritage among communities in the Sierra Norte de Oaxaca. Using the region as an extended case study, this paper seeks to assess the principal challenges and prospects of heritage protection as archaeological research advances. Will we see a deepening of our knowledge at the possible cost of greater vulnerability to archaeological resources? How do we respond to community expectations of respect for their interests while protecting societal interest in heritage sustainability?

Corcoran Tadd, Noa (Harvard University)

[128] *Charki and Red Currant Jam: Provisioning Extractive Industries in Republican Highland Peru*

With the current boom in the archaeology of the colonial period in the central Andes, we risk losing sight of the potential for archaeological investigation of the colonial aftermath. Following important work further afield in the Southern Cone, I argue for the particular relevance archaeology could have in exploring trade liberalization, emancipation, and the new commodity booms of the nineteenth century. Drawing on the recent investigation of a series of Republican tambos (roadside inns) in the highlands of Palca (Tacna, modern-day Peru), the case study examines patterns of mobility and consumption as these sites were transformed by new extractive industries (primarily silver, copper, and sulfur) in the region. Tying together the growing British entrepreneurial presence and the resilience of 'traditional' forms of mobility and provisioning, these sites point toward a wider story of an emergent regional mining economy that both superseded previous circulations tied to the great silver mines of the altiplano and left a landscape of boom-and-bust development with uneasy resonances with the present.

[202] *Chair*

Cordero, Robin [332] see Dello-Russo, Robert

Cordova, Carlos

[121] *The Environmental Context of the Middle Pleistocene Occupation at the Shishan Marsh, Azraq, Jordan*

The Greater Azraq Oasis Area occupies a hyper-arid area of the Syro-Arabian Desert. Geomorphological and paleoecological evidence suggests that at times during the Pleistocene the region experienced moister conditions than at present. This particular study centers on the environment surrounding the Middle Pleistocene hominin occupation dated approximately 250,000 BP. Archaeological and archaeozoological remains from this occupation have provided significant information about the wide range of faunal groups and butchering strategies. Geoarchaeological and paleoecological (mainly plant microfossil remains) research provide an environmental context to this occupation, which existed in association with a fan-delta on the northeast shores of paleo-lake Azraq. The lake-delta dynamics provided a rich wetland environment. A local fault influenced the flow of water from springs and stream channels into the delta. The up-thrown block of the fault created an outcrop where the local Umm Rijamm Chert could be utilized. The sedimentary data and geomorphic evidence elsewhere in the basin suggests that conditions deteriorated toward the end of the occupation, as the lake receded and dried out and the fluvial systems ceased to flow into the occupation area. Eolian activity suggests the aridization that forced fauna and hominins out of this area.

[121] *Chair*

Cordova, Carlos [121] see Nowell, April

Cordova, Guillermo (Guillermo Cordova) and Benno Fiehring (INAH)

[94] *Avances en el estudio de la organización sociopolítica prehispánica en la región del Río Tampaón, S.L.P., México*

El estudio de la organización política de la región de Tamtoc, tiene por objeto indagar en las relaciones que existieron entre los individuos, las formas en que ejercieron el poder político y la naturaleza y escala de su organización. Para realizar este propósito llevamos a cabo un programa de prospección arqueológica con el objeto de reconstruir los patrones de asentamientos y posible uso del antiguo paisaje. En esta ponencia presentamos los resultados de dos temporadas de trabajo en campo.

Córdova, James [306] see Sanders, Mariana

Coria, Melissa [214] see Demarte, Pete

Corl, Kristin (New Mexico State University), John Roney (University of Texas San Antonio), Mary Whisenhunt (University of Texas San Antonio) and Robert Hard (University of Texas San Antonio)

[303] *Settlement Patterns of Salado Period Occupations in the Duncan/York Valley on the Upper Gila River*

The Salado period occupation sites have become the focus of substantial discussion in the Southwest as it relates to broader regional migrations, population fluctuations as well as sociocultural changes. Unfortunately many of these important sites have suffered from decades of destruction and continued looting. Comparing early site notes from the Gila Pueblo and other early researchers in the Duncan/York Valley to the University of Texas at San Antonio Southwest field project survey notes, this area has been a target of these destructive processes. However, documentation of the remnants of sites can still offer valuable information about the character of the Salado occupation and the circumstances under which the Salado horizon becomes visible. While many of the material traits used to define Salado occupation such as architecture, burial traits, and whole ceramic vessels are the first to be destroyed, information related to a site's placement in space and material present can still provide important information.

Corl, Kristin [344] see Hard, Robert

Cormier, Aviva (Boston University) and Francisco Estrada-Belli (Tulane University)

[101] *Regional Diversity and Population Migration of the Classic Maya: Stable Isotope Analysis of Individuals from the Holmul Region, Guatemala*

Stable isotope analysis is a productive tool for understanding the migratory histories of past populations in various regions of the world, including the ancient Maya. This paper presents the strontium and oxygen isotopic ratio values of dental enamel samples as compared to the geographical location of burial to address questions of regional identity, population migration, and social complexity of the Maya at the archaeological site of Holmul and the nearby centers of La Suficaya, K'o, Cival, Hamontun, Barton Ramie, and Uaxactun. The results of 68 individuals are reported here, selected from the osteological remains excavated by the current Holmul Archaeological Project and early twentieth century excavations by the Peabody Museum of Archaeology and Ethnology at Harvard University. The biological profiles of the individuals (burial treatment, estimated age, biological sex, perimortem trauma, cultural modification, pathology, and/or dental health) are combined with stable isotope analyses to understand the geographical diversity and mobility patterns of the Classic Maya. The application of this methodology can serve to encourage scholars throughout the Maya region and the world to analyze dental enamel as an alternative to bone collagen, especially in situations of poor preservation of human remains and difficult excavation locales.

Cornejo, Luis [134] see Sepúlveda, Marcela

Cornell, Per [28] see Ling, Johan

Cornish, Travis [83] see Walling, Stanley

Coronado, Anabella (Universidad del Valle de Guatemala)

[246] *Chair*

Corrales, Francisco [360] see Herrera, Roberto

Correa, Daniel [62] see Silva, Rosicler

Cortegoso, Valeria [91] see Castro, Silvina

Corteletti, Rafael (University of São Paulo) and Paulo DeBlasis (University of São Paulo)

[45] *Bonin Site: A Circular Village on Southern Brazilian Highlands?*

Bonin site is one of many pit house villages located in Santa Catarina state, southern Brazilian highlands. It has been excavated since 2011. In this paper, we aim to present new data on pottery analysis, chronology, and spatial analysis which are suggesting a village plan organized in a circular shape. Dated from thirteenth to seventeenth centuries this village has 23 pit structures, many of them used as pit ovens, filled with basalt rocks and ceramic vessels. Microbotanical remains analysis reveals the consumption of manioc (*Manihot esculenta* Crantz), beans (*Phaseolus* sp.), and possibly yams (cf. *Dioscorea* sp.) in addition to maize (*Zea mays* L.) and squash (*Cucurbita* sp.). Macrobotanical and faunal remains recovered by flotation reveals the consumption of pinhão (*Araucaria angustifolia* nut), beans, Arecaceae nuts, as well fish, small mammals, and birds. The circular shape is easily identified in Jê villages located far north in Brazil, but it is a novel interpretation for ancient southern Jê settlements.

Cortés, Leticia [164] see Scattolin, María

Cortes-Rincon, Marisol (Humboldt State University), Erik Marinkovich (University of Texas at San Antonio), Cady Rutherford (University of Texas at San Antonio), Spencer Mitchell (Texas Tech University) and Kyle Ports (Texas Tech University)

[83] *Production and Intensification in Hinterland Communities*

This study investigates the nature and intensity of ancient Maya household economies in northwestern Belize. The primary focus will be centered on investigative ways in which settlement pattern data offers insight to understanding production systems in hinterland communities. The preliminary patterned relationship that emerged among settlement features and land resources allowed for the interpretation of land management strategies and production systems implemented in different environment zones of the study area. Geospatial analysis of raw material procurement and distribution will be examined through the use of a Geographic Information System (GIS). Furthermore, spatial distribution of cultural materials should provide insight into the regional and localized circulation of goods. Results of this study will demonstrate how a hinterland community stratified land resources and built its local landscape into a complex diversified production area specialized in the production of marketable commodities.

Cortes-Rincon, Marisol [101] see Marinkovich, Erik

Cortez, Carmen [162] see Winterhalder, Bruce

Cossin, Zev**[331] *Community and the Contours of Empire: The Hacienda System in the Northern Highlands of Ecuador***

Recent archaeological studies of Spanish colonialism have redirected scholarly attention both to the workings of imperialism and the multitude of ways in which marginalized populations navigated and remade the grids of power that constitute empire. A focus on the household and the materiality of everyday life has generated a rich body of evidence by which to tack between multiple scales of social life and foreground the material culture of daily life as constitutive elements in the making of social and political worlds. In Spanish America, the hacienda system was one means by which imperial logic took root. In this paper, I review preliminary archaeological investigations of the Hacienda Guachalá in the northern highlands of Ecuador, where excavations have begun to illuminate the domestic material realities of indigenous laborers and the lifeworlds they fashioned amid profound social and economic transformation over the long nineteenth century. Focusing not only on access to material goods but also to the ways in which such goods foreground collective obligations and identities suggests that the concept of "community" is key to understanding daily negotiations of empire by indigenous actors. Importantly, this approach emphasizes the enduring effects of imperial designs after the end of formal colonialism.

Cossin, Zev [220] see Boyd, Siobhan

Costa, Angelica (University of Central Florida), Lane Fargher (Centro de Investigación y de Estudios Avanzados de), Richard Blanton (Purdue University), Verence Y. Heredia Espinoza (Centro de Estudios Arqueológicos, El Colegio de Mi) and John K. Millhauser (North Carolina State University)

[215] *Crafting, Identity, and Power: A Comparative Analysis of Late Postclassic Facial Adornment Use in Central Mexico*

In prehispanic Mesoamerica, individuals from diverse regions and social classes deployed facial adornments, such as ear spools and lip plugs, to materialize concepts of identity. Specifically, recent archaeological research at the Late Postclassic (AD 1250–1521) city of Tlaxcallan provides new insights into the role of facial adornments in a highly collective society. Tracing material sources reveals the inter-workings of regional and local economic interactions and local sociopolitical institutions impeding on distribution. Similarly, various styles of decoration can also reflect the sharing of cultural ideas between different settlements and regions and how Tlaxcaltecs identified within their own communities in relation to status, age, and gender. By looking at the distribution of raw materials, finished goods, and styles, we document the degree to which facial adornments were restricted to certain statuses/classes, genders, and age groups and, thereby, shed light on the social encoding of these items. Such information can then be used to evaluate the interplay between the degree of social embeddedness and degree of collectivity. Thus, facial adornments have the potential to provide information of great significance in revealing how economic and social institutions impeded on the production, distribution, and consumption of facial adornments among states during the Postclassic.

Costello, Eugene (University of Notre Dame)**[207] *Cows, Wolves, and Witches: The Question of Marginality within Transhumant Communities of Western Ireland***

Small-scale transhumant movements were once quite common in Ireland, and continued in places like Conamara, Donegal and Achill Island up to the late nineteenth century and early twentieth century. Also known by the term "booleying," these practices involved young people, usually girls, bringing dairy cows up to hill pastures for the summer so as to free up land at home for tillage and winter fodder. However, the seasonal landscapes and settlements which they visited have until recently been neglected by archaeologists. Moreover, a significant amount of unexplored oral tradition exists in the Irish language. Some of this contains highly symbolic stories about supernatural interactions at summer pastures. This paper uses archaeological survey to interrogate the folk material and ask what it says about the social position of young female herders in nineteenth-century Ireland. It discusses their interactions, firstly, with one another and, secondly, with senior male figures in the home settlements. Is it justifiable to describe the young women as inhabiting marginal land when their economic role was absolutely central? To what extent were hill pastures considered to be liminal or dangerous places? Does the field archaeology support the idea that summer settlements were organized differently to home settlements?

Costin, Cathy (California State University, Northridge)**[323] *Discussant*****Costin, Kirk (Mesa Community College) and Donna Nash (University of North Carolina Greensboro)****[232] *Ceramic Differences at the Household/Neighborhood Level at Cerro Mejía: Evidence of a Possible Multiethnic "Mitmaquna" Community on the Southern Frontier of the Wari Empire***

This poster will present the results of the analysis of household ceramic assemblages from the slopes of the secondary Wari center Cerro Mejía in the Moquegua Valley. The slopes of Cerro Mejía are divided into distinct domestic neighborhoods by fieldstone walls. Based on differences between these neighborhoods observed during excavations it has been hypothesized that this site was a multiethnic community similar to Inca mitmaquna with local inhabitants from throughout the region and possibly inhabitants from other locations in the Wari Empire. The analysis of ceramics from households in different neighborhoods appears to confirm the multiethnic nature of this community. Although there are some similarities across the site, the ceramic assemblages from each household suggest that ceramics were not centrally manufactured and distributed. Instead, the evidence suggests ceramics were manufacture at the household level. The assemblages were sufficiently different from each other to suggest that they were made not just by different individuals but by individuals who came from distinct ceramic manufacturing traditions. The goals of this poster are to clearly demonstrate the observed ceramic differences in detail and to discuss how these findings inform us about Wari imperial organization on the southern frontier of the empire.

Costopoulos, Andre (University of Alberta)**[38]** *Can You Model My Valley? Particular People, Places, and Times in Archaeological Simulation*

Every archaeological modeler, whether generalist or particularist, eventually gets asked whether "their model" can help reconstruct a particular past. Could a general archaeological simulation engine be built that can be customized to answer specific questions about specific archaeological contexts, or is simulation a tool that must remain largely general and heuristic? I will argue both that it is useful to work toward a general archaeological simulation engine, and that such an engine could help us understand what processes generated particular sets of archaeological remains, but that it won't help us reconstruct particular pasts. I will also discuss the difference between these levels of understanding.

Coughenour, Chance [83] see Walling, Stanley

Coughlan, Katelyn [259] see Sawyer, Elizabeth

Coumont, Marie-Pierre [85] see Boileau, Arianne

Countryman, James (University of Chicago) and Gregory Zaro (University of Maine)**[53]** *Agrarian Landscapes of Coastal Croatia: A View from Nadin-Gradina*

Generalized models of Mediterranean agroecosystems often elide the specific historical and political contexts in which food production necessarily takes place. This paper presents new historical-ecological research currently underway at the multi-period settlement site of Nadin-Gradina near the Adriatic coast of southern Croatia, a typically "Mediterranean" landscape that has hosted a dynamic social-political history of repeated invasion, migration, and colonization by a variety of human actors. The Nadin-Gradina Archaeological Project is endeavoring to elucidate the complex life history of this settlement and local environmental impacts of urbanization from late prehistory to the modern era. Attempting to think beyond basic questions of "subsistence" and "adaptation," the research presented here asks how factors such as warfare and political destabilization were central in creating various configurations of land use and human-plant-animal relationships. A macrobotanical assemblage from our 2016 excavations is compared with other local datasets, including faunal remains, stable isotope data, and historical cartography, to develop hypotheses regarding historical continuity and variability in agropastoral practices. While broad historical continuities in the presence of economically important taxa are apparent at the regional level, our data begin to show marked diachronic variability the local level in usage of land and organization of urban-rural space.

Counts, Derek (University of Wisconsin-Milwaukee)**[312]** *Discussant*

Counts, Derek [37] see Averett, Erin

Coupland, Gary (University of Toronto)**[176]** *A History of Household Archaeology at Prince Rupert Harbour*

The practice of household archaeology has a long history in the Prince Rupert area, owing in large part to the remarkable preservation of sites in the region including the existence of house depression features on the ground surface of many village sites. Approaches to investigating these house features have shifted over the years as new theoretical paradigms have arisen to replace older ones. Issues of chronology and culture history dominated early investigations, but more recently questions pertaining to social history have come to the fore. This paper reviews the use of household archaeology in the Prince Rupert area from its beginnings to the present and argues that the continued investigation of households is essential to understanding aboriginal social history in the region.

Coupland, Gary [223] see Leclerc, Natasha

Coutros, Peter (Yale University) and Jessamy Doman (Yale University)**[146]** *People and Paleoclimates at the Diallowali Site Complex: Changing Patterns along the Middle Senegal Valley throughout the First Millennium BC*

The first millennium BC was a time of considerable social, technological, and environmental change for the peoples of West Africa. Despite the growing number and distribution of archaeological projects throughout the region, very little is known about this critical period. Likewise, many of the climate models currently in use lack the sufficient temporal or spatial resolution needed to provide context for the variety of changes occurring at a localized level. Recent research at the Diallowali Site Complex along the Middle Senegal River Valley has provided a unique opportunity to investigate how first millennium BC social and environmental changes are linked. Combining stratigraphic excavations and large-scale, systematic survey, the Diallowali Archaeological Research Expedition (DARE) has compiled a detailed record of human habitation and climate change along the western margin of the Middle Senegal Valley. A multi-proxy approach to paleoclimate modeling and a detailed record of changing subsistence strategies and settlement patterns has provided a robust and localized dataset spanning the late second and first millennia BC. This paper will utilize this new body of research to explore the dynamic relationship between the changing environment and the human communities that called it home.

Coutu, Ashley (University of Cape Town/University of York) and Judith Sealy (University of Cape Town)**[161]** *The Roots of Global Trade in the Southern African Iron Age*

During the African Iron Age from AD 800 to 1200, overseas trade began to expand out of southern Africa across the Indian Ocean, which caused an increase in the export of raw materials such as ivory. Archaeological evidence of ivory working has been found on sites across southern Africa dating to this period, including KwaGandaganda and K2 in South Africa, Kaitshaa and Bosutswe in Botswana and Ingombe Ilede in Zambia. It is unknown whether the raw ivory was obtained locally or traded in, whether certain sites were production centers, and which markets drove the demand for the manufacture of ivory bangles/bracelets. To this end, we explore the distribution and frequencies of ivory artifacts and working debris across these sites. We also report the results of carbon, nitrogen and strontium isotope analysis to understand the origins and procurement of the ivory alongside Zooarchaeology by Mass Spectrometry (ZooMS) analysis to identify the species of the ivory. Results indicate that the worked ivory derived from

elephants and that at some sites, ivory was derived from several catchment areas, implying a degree of landscape/resource partitioning. These sites therefore yield the earliest evidence for the trade of ivory in southern Africa.

Covell, Kevin [169] see Egeland, Charles P.

Covert, Alexandra (Petrified Forest National Park)

[304] *Following the Shell Trail: Analysis of Prehistoric Shell at Petrified Forest National Park*

Shell jewelry at Petrified Forest National Park has been found from Basketmaker II through Pueblo IV. Since there are no local sources of marine shell, it is important to understand how trade routes from the Gulf of California and the Gulf of Mexico directly affected how shell was traded to this region. Shell recovered from archaeological contexts curated in the Petrified Forest National Park collections were typed according to class, genus, and species and were sourced to the Gulf of California or the Gulf of Mexico. The shell was analyzed by temporal components to see if any discernible consumer patterns occurred. This analysis was conducted to determine if shell use was dependent on shell type or procurement location and to determine variability in shell use over time. A literature review was conducted to determine possible trade routes from both the Gulf of California and the Gulf of Mexico to Petrified Forest National Park. Ultimately this project will enhance the understandings of shell use, procurement, trade networks, and temporal consumer patterns on the Colorado Plateau.

Covey, R. Alan (University of Texas at Austin) and Miriam Aráoz Silva (Professional Archaeologist)

[331] *Empire in Ruins: Inca Urban Planning and the Colonial Occupation at Huánuco Pampa*

Located in the Andean highlands of northern Peru, the Inca administrative center at Huánuco Pampa served as a provincial capital, drawing thousands of tributary households into scripted encounters with imperial officials on festive occasions. Inca site planning created spaces for performing diverse identities and reinforcing relationships between local people and Inca elites. After an unsuccessful Spanish attempt to establish a town within the central plaza of the site, Huánuco Pampa faded to a peripheral status, serving as a remote way-station on a Colonial highland route. The disembedded location of Huánuco Pampa contributed to the Spanish failure to maintain a central element of Inca provincial administration. Nevertheless, more attention needs to be given to how the long-term trajectory of the Colonial Period occupation was influenced by its dependence on, and departure from, principles of Inca urban planning. This paper will present the results of new architectural research from the eastern part of the site (Zone II), discussing how the distribution of Inca construction aesthetics and open spaces relates to the Colonial contexts that Craig Morris excavated in that part of the site during the 1960s and 1970s.

Covey, R. Alan [331] see Quave, Kylie

Cowan, Maya (University of Victoria) and Vanessa Tallarico (University of Victoria)

[263] *Cemetery Study at Emanu-El Jewish Cemetery in Victoria, British Columbia: A Look at the Potential Benefits of Simple, Shrouded Burials and the Use of Concrete Fills*

The goal of our research was to analyze the correlation between decomposition, and damage to memorial structures around the Emanu-el Jewish Cemetery in Victoria, British Columbia. We hypothesized that some concrete fill damage was due to casket decay after the fill was placed, causing it to sink or crack. We used damaged double plots with a single fill as evidence, because the side of the older burial had time to settle before the fill was poured over both plots. We found that damage was almost always on the side of the most recent burial, where the ground had not settled beforehand. Jewish custom dictates that memorials be placed one year after burial, and that all materials used in burial be completely biodegradable. In some Jewish traditions, bodies are shrouded for burial, rather than placed in the pine caskets used by many communities. Since a human body decomposes much faster than a casket, concrete fills could be used for a shrouded burial with less possibility of damage. Prior to our research, we were informed that Victoria's Jewish community has expressed interest in accessing more traditional burial customs. We offer our results to the community to consider in their future practice.

Cowley, Dave [250] see Mitchell, Juliette

Cox, Jim (Oklahoma Anthropological Society)

[150] *Discussant*

Cox, Kim and Carolyn Boyd (Shumla Archaeological Research and Education Center)

[126] *The White Shaman Mural: The Story Behind the Book*

The prehistoric hunter-gatherers of the Lower Pecos Canyonlands created some of the most spectacular rock art of the ancient world. Perhaps the greatest of these masterpieces is the White Shaman mural. This presentation provides an introduction to our recently-published book *The White Shaman Mural: An Enduring Creation Narrative*, which is one of the most comprehensive analyses of a rock art mural ever attempted. Drawing on twenty-five years of archaeological research and analysis, as well as insights from ethnohistory and art history, we identified patterns in the imagery that equate in stunning detail to the mythologies of Uto-Aztecan-speaking peoples, including the ancient Nahua and present day Huichol. The identification of core Mesoamerican beliefs in Pecos River style rock art reveals that a shared ideological universe was already firmly established among foragers living in the Lower Pecos as long as 4,000 years ago.

Cox, Kim [126] see Boyd, Carolyn

Crabtree, Stefani (Washington State University) and Tim Kohler (Washington State University)

[38] *Modeling Polity Growth among Ancestral Pueblo People in the Northern San Juan*

In this paper we present research on the development of village-spanning polities in the central Mesa Verde region. First, we explore the dynamics of modeling not only households, but also groups of households, and how the interaction between them influences the development of social strategies. Second, we examine how territoriality shapes group development; we allow our agents to track lineage, and for lineages to own land, which, when populations increase, creates conflicts over the most productive lands. We apply models for the development of conflict and warfare on top of the "Village" agent-based model to examine how territoriality and conflict interact, allowing matrilineal groups to subsume competing groups in a chain of dominance and subordination to create large village-spanning polities. Finally, we demonstrate the dynamics of polity formation in the central Mesa Verde by showing the construction and dissolution of polities through time, comparing new data compiled from the archaeological record with output from our simulation.

[268] *Discussant*

Craib, Alexander [92] see Jansen, Amelia

Craig, Douglas (Northland Research), David Abbott (Arizona State University), Hannah Zanotto (Northern Arizona University), Veronica Judd and Brent Kober (Northland Research)

[335] *Measuring Household Inequality in Hohokam Society: An Analysis of Domestic Architecture at Pueblo Grande*

Recent archaeological efforts to explain the emergence and persistence of social inequality have been hampered by a lack of information about how wealth was transmitted across generations and how it may have accumulated or diminished over time. Building on studies that have shown domestic architecture to be an excellent material expression of household wealth, we provide a method for reconstructing the amount of labor invested in house construction at Pueblo Grande, taking into account different architectural styles from different time periods. Our analysis found variability in construction costs that was probably related to wealth and status differences among households, which persisted over time. High-status households were distinguished architecturally by larger and, in some instances, more elaborate houses. The proximity of these households to the village central precinct, a locus of ceremonial expression, further suggests that ritual played a key role in creating and maintaining inequality in Hohokam society.

Craig, Lorena (University of Montana)

[374] *Mapping Evolutionary Histories of Oceanic Mythology: Can Phylogenetic Methods Applied to Creation Myths Increase Our Understanding of Prehistoric Migrations?*

This study seeks to understand the means of dissemination of oral cultural traditions of Oceania across time and geographic space. I hypothesize evolutionary trees produced from analysis of creation myths provide a means to infer prehistoric migrations routes. Additionally, creation myths and language have parallel evolutionary history and form a combined set of core cultural traditions. In order to test these hypotheses, creation myths, selected from the earliest recorded versions from Oceania, will be analyzed using quantitative methods from the biological sciences. Results from phylogenetic methods and other statistical analysis of datasets will demonstrate that in the case of language and creation myths, evolutionary processes of culture traditions can be intertwined. Moreover, by using data from other fields such as linguistic, genetics, archaeology, ethnology, and physical anthropology, the validity of using mythology as a proxy for migration can be measured. In a broader sense, phylogenetic studies, like this one, will provide new insights into evolutionary processes of sacred oral traditions and understanding of the evolutionary dynamics between multiple cultural traditions. Additionally, I propose this research will add to existing studies of prehistoric migration in Oceania, and provide a model for similar research in other regions.

Craig, Oliver [96] see Hendy, Jessica

Craig-Atkins, Elizabeth

[139] *The Chronological and Liturgical Context of Charnel Practice in Medieval England: Manipulations of the Skeletonized Body at Rothwell Charnel Chapel, Northamptonshire*

The rare survival of a charnel chapel and the commingled remains of more than 2,500 individuals it houses at Holy Trinity Church, Rothwell, England, provides a unique opportunity to investigate the postmortem manipulation of human remains in the medieval period. The apparent paucity of charnel chapel sites in England has led to the dismissal of charneling as a marginal practice with little liturgical significance, a pragmatic solution to the need for storage of disturbed bones. Yet the evidence from Rothwell, and a further c. 60 lost or misunderstood charnel chapel sites our project has uncovered, suggest that human remains stored in subterranean chapels served an important role as a focus for intercessory prayer. Here, both the local faithful and pilgrims could pray for the souls of the dead while their physical remains provided a tangible focus for their devotion. This paper explores the chronology and significance of charneling in medieval England, presenting the first radiocarbon dating evidence for human remains obtained from a charnel chapel. It argues for the widespread and instrumental role of manipulated human remains in early Christian practices in England and reflects on how this role has changed over the last 700 years.

[139] *Chair*

Craig-Atkins, Elizabeth [139] see Hadley, Dawn

Crangle, Jennifer [139] see Craig-Atkins, Elizabeth

Crann, Carley (A.E. Lalonde AMS Laboratory)

[86] *Radiocarbon Age of Consolidants and Adhesives used in Archaeological Conservation*

When radiocarbon dating archaeological material, it is paramount to understand how the object was conserved and which conservation products were used in order to determine: 1) the best location on the artifact to sample; 2) how to remove the consolidant physically and/or chemically, and; 3) whether or not the consolidant was successfully removed. The archaeologist usually knows the approximate age of the artifact given the context in which it was found so when the radiocarbon age is not as expected, it is possible the consolidant was not completely removed. However, without knowing the radiocarbon signature of the consolidant—this is purely speculation. Current, commonly used consolidants and adhesives cover both natural (animal and fish glues, tree resins, starches) and synthetic materials (acrylics, poly (vinyl acetates), poly (vinyl butyrals), polyethylene glycol, glycerol, cellulose ethers, cellulose esters, cyanoacrylates and soluble nylon). This paper will present data that indicate in which direction—young or old—conservation treatments may skew radiocarbon dates and the importance of knowing the conservation history of older samples and how these results should be interpreted. In addition, a case study on preserved carbonized residuals is presented.

[256] *Discussant*

Crann, Carley [227] see Martindale, Andrew

Crass, Barbara [387] see Krasinski, Kathryn

Crawford, Kristina (University of Nevada, Reno)

[21] Prehistoric Cooking with Rock and Rock Substitutes in the Sacramento Valley, California

When populations increase, more resources need to be extracted from the land to satisfy their needs. When cooking, one way to increase yields is to change techniques to include rock heating elements. To test this, twenty sites from the Late Archaic Period (3000 to 150 BP) in the northern Sacramento Valley of California were examined. The results of the study indicated that there is an increase in rock heating elements and thermally altered rock in archaeological deposits through time. It was noticed during the study that at the same time that rock heating elements increase in frequency in the archaeological record in the Sacramento Valley, substitutes for rock, specifically clay cooking stones were also introduced into the record. To test the validity of clay as a substitute for rock, a series of experiments have been conducted to determine heating ability, fracture rates, and fuel use. The results of rock versus clay cooking abilities are presented here.

Crawford, Gary (University of Toronto)**[24] Hokkaido, Japan, as an Island System in East Asian Precolonial History**

Hokkaido, Japan, is an island separate from the East Asian mainland and Honshu yet closely linked culturally to the rest of the Japanese archipelago. Hokkaido was never isolated entirely from the East Asian mainland either. This paper reviews several key events that relate to Hokkaido as an island with a distinct cultural history. As the contemporary home of an indigenous population, the Ainu, Hokkaido has played, and can continue to play, an important role in our understanding of cultural trajectories in East Asia. Two cultures linked almost solely to Hokkaido as well as to Ainu development, the Epi-Jomon and Satsumon cultures, are examined from the perspective of how being situated on Hokkaido facilitated unique adaptations to and within the broader East Asian socioeconomic sphere. In particular, the cultural changes resulting from the incursion of a mainland form of agricultural society and economy to Japan beginning ca. 2800 BP resulted in a transformation of the cultural landscape throughout Japan except Hokkaido by ca. 2300–2000 BP. Hokkaido, being an island, participated in the transformation in a distinctive manner, first resisting change but ultimately participating in the transformation as evidenced by the formation of the Satsumon culture, the ancestors of the Ainu.

[78] Discussant**Crawford, Katherine (University of Southampton)****[38] Visualizing the Invisible: How Can We Model Roman Religious Processions?**

Religious processions colored the ancient world, filling a city's streets with a multi-sensorial display of sounds and images. Although the presence of processional activity is acknowledged as a regular occurrence in the Roman world, our understanding of their movement patterns and their effect on the cityscape remains understudied. The record of processions was held primarily in the memories of those who experienced or took part in the festival, only manifesting within the archaeological record as a testament to their occurrence in the form of temples or monumental arches. The nuances of how a procession traversed a city's streets and its urban impact are not easily revealed. Applying a computer-based approach to the study of processional activity allows new questions to be asked of a well-recognized Roman ritual. This paper considers the role that processions played within the city of Ostia, Rome's ancient port. The application of a model-based methodology allows for critical analysis of a procession's movement patterns by studying processions as a dynamic event that engaged both with a city's inhabitants and the built environment. The use of computer models in combination with archaeological material offers new insight into ritual experiences within Ostia.

Crawford, Laura [53] see Weiland, Andrew

Creager, Brooke (University of Minnesota)**[282] Migration and Cultural Change: Effects of Migration on Ritual Practices in Early Medieval Britain and Colonial America**

A migration can have several different effects upon a native population as the groups interact: the decimation of one population either to famine, disease or war, the cultural integration of the two groups either forcefully or peacefully, or the continued separation of the two cultures through distance or social stratification. These effects are perhaps best understood archaeologically through an examination of the European and Native American interactions beginning in the sixteenth century and those results can illuminate the Anglo-Saxon and Britons' interactions in fifth- and sixth-century England. In Early Medieval Britain, there are few texts to aid the understanding of the fifth-century Anglo-Saxon migration. The Anglo-Saxon practices were likely appealing and socially advantageous, since they culturally dominated the landscape within a century, but the Britons, like the Native Americans, would have preserved aspects of their own traditions. The efforts of the Native Americans and Britons to maintain a cultural distinction can be observed through the analysis of ritual practices and materials within the European and Anglo-Saxon societies, respectively. Through the analysis of ritual practices of these two groups, this paper will explore cultural continuity and maintenance of traditional practices within the context of a transitioning cultural landscape.

Creel, Darrell [303] see Romero, Danielle

Creer, Sarah [79] see Cannon, Mike

Crema, Enrico (University of Cambridge) and Stephen Shennan (UCL)**[227] Detecting Spatially Local Deviations in Population Change Using Summed Probability Distribution of Radiocarbon Dates**

The increasing availability of large radiocarbon databases encompassing continental geographic scales (e.g., CARD, EUROEVOL, AustArch, etc.) is now opening new possibilities for evaluating spatial variation in prehistoric population. We have, for the first time, the opportunity to determine whether and when different geographic regions experienced distinct demographic patterns using an absolute chronological framework. This line of research is however hindered by spatially uneven sample sizes reflecting differences in regional archaeological practices. Furthermore, given that spatial resolution is intertwined with the sample representativeness, the choice of appropriate scale of analysis becomes a non-trivial issue. Existing solutions have overcome some of these problems (e.g., by using correction surfaces) but no methods have been devised to assess the statistical significance of the observed differences in the inferred population trajectories. Current cross-regional comparisons of SPDs are thus limited to qualitative accounts, with a considerable risk of failing to distinguish genuine differences from spurious ones arising from sampling error. Here we propose a new method that overcomes many of these problems. We test the robustness and applicability of our solution through two case studies (a simulated dataset and the EUROEVOL database) showing the limits and the potentials of our approach.

Crema, Enrico [57] see Biagetti, Stefano

Crespo Torres, Edwin [156] see Roman Buso, Gabriela

Criado-Boado, Felipe**[324]** *Materialization of Social Resistance: Trends on NW Iberia Late Prehistory and Protohistory and Beyond*

This paper deals with a so-called negative approach to social complexity and social development. Instead of understanding the arising of complex societies as a result of positive ontology, it focuses on the resistances, negations and the invisible that tried to avoid or at least to minimize social inequality and exploitation. The arising of complex societies could, alternatively, be conceived as the trend to resist social division and its generalization. The paper will show as the material traces of archaeological record and the different dimensions of materialization processes could reflect in certain contexts communities' strategies against the social division. The paper will focus on the development of monumentality and iron metallurgy. While primarily based on archaeological evidence from Galicia (NW of Iberia Peninsula), looking at late prehistory dynamics from IV to I millennia BC, it will also deal with case studies from other parts of the world as South America and Central Africa.

[158] *Discussant***Crider, Destiny (Luther College)****[120]** *Examining Tula Region Ceramic Compositional Analysis*

Chemical characterization of ceramics using Neutron Activation Analysis (NAA) in Central Mexico has proven to be an important analytical approach for assessing exchange, especially between subregions within the Basin of Mexico and neighboring areas. Recent efforts based upon Epiclassic and Early Postclassic Period decorated ceramics have extended the sampling to the ceremonial centers and settlements of Tula Chico and Tula Grande, the resulting chemical analysis defined a more robust compositional group for the Tula region. Building upon these findings, the Tula Region Interaction and Migration Project (TRIMP) targets additional ceramics from Epiclassic centers within the Tula region for NAA analysis. Sampling targets distinctive pottery pastes and decorative styles across multiple sites in an effort to further establish the regional signature for Tula production, but also to test and revise previously proposed compositional groups within the Tula region. Findings address the larger goal of the project to examine interactions and exchange within the Tula region.

Crider, Destiny [120] see García Sánchez, Jorge

Cristiani, Emanuela [290] see Boric, Dusan

Cristóbal-Azkarate, Jurgi [193] see Lew-Levy, Sheina

Criswell, Janice [138] see Henrikson, Steve

Crocker, Andrew [11] see Kotsoglou, Anastasia

Crockford, Susan [46] see Stewart, Kathryn

Croes, Dale (Washington State University) and Ed Carriere (Suquamish Elder and Master Basketmaker)**[138]** *Reawakening a 2,000-Year-Old Salish Sea Basketry Tradition and Sharing It around the World: Master Salish Basketmaker and Wet Site Archaeologist Explore 100 Generations of Cultural Knowledge*

Ed Carriere and I have been working with the U.W. Burke Museum to replicate 2,000-year-old waterlogged archaeological basketry found in the early 1960s from along the Snoqualmie River near Seattle. Ed learned old style split cedar limb/root clam basket making from his great-grandmother, Julia Jacobs, who raised him. Ed's goal has always been to go back as many generations in his family to master their work. As a wet site archaeologist specializing in ancient basketry on the Northwest Coast, I work from the other direction, deep-time, statistically linking ancient basketry styles from throughout the region to the present. I had a brilliant idea while reassessing the 2,000-year-old basketry collection from the Snoqualmie River site, asking Ed to try replicating these baskets that statistically linked through 100 generations from this site through 1,200-, 750-, and 500-year-old Salish Sea wet site basketry to his great-grandmother's old style in an approach we call generationally linked archaeology. Local Native weavers and anthropologists applaud this work and last summer we shared our work with the Indigenous Ainu on Hokkaido, Japan, and with archaeologists at the Wetland Archaeology Research Project (WARP) conference in Bradford, England, to a good response.

Cronin, Joseph (Harvard University), Anna Guengerich (Vanderbilt University) and Parker VanValkenburgh (Brown University)**[230]** *Chacras in the Clouds: Documenting High-Altitude Agricultural Landscapes in the Tambillo Valley of Chachapoyas, Peru*

Here we present preliminary results from targeted prospection and an Unmanned Aerial Vehicle (UAV) flight over the relic agricultural landscapes of the Tambillo Valley in northeastern Peru. This work was carried out as part of the first phase of Proyecto Arqueológico Tambillo (PATA), a project investigating the organization of political landscapes in the montane forest region of Chachapoyas. Specifically, PATA aims to determine whether the densely-clustered Late Intermediate Period settlements at the confluence of the Atúen and Tambillo rivers were politically autonomous, independent settlements or a single socially integrated—if geographically fragmented—urban system. The first stages of prospection during the 2016 season documented at least four relic agricultural landscapes featuring several different modes of landscape modification. We discuss the diversity of these landscape modifications as well as their distribution throughout the Tambillo area relative to Late Intermediate Period settlement. As the spatial organization and technical requirements of these field systems can inform reconstructions of social organization in the Tambillo plain, we present a 3D model and high-resolution orthoimage of terraced sink-holes at La Boveda. This partial model of La Boveda demonstrates the promise of UAV work for studying well-preserved, high-altitude agricultural landscapes in the region.

Crothers, George (University of Kentucky)**[286]** *The Original (Affluent) Cooperative: Property Rights and the Foraging Mode of Production*

Property rights require fundamental forms of cooperation. On a global scale, foragers maintained open-access property regimes, in which no one is excluded from using resources. In the most basic form, foragers cooperate simply by avoiding conflict—agreeing to share. These conditions will hold as long as the cost of excluding others from a resource exceeds the benefits derived from that resource and because cooperation increases reproductive success under conditions of low population density—in other words, when resources are plentiful or when foragers radiate into uninhabited

environments. However, within variable environments and dynamic populations, common property regimes emerge when the benefit from exclusive access to resources exceeds the cost of defining, monitoring, and enforcing rights to those resources. On a local scale, foragers created qualitatively new property institutions that required collective responses to achieve common goals. Archaeologically, how do we identify changing property-rights regimes in prehistory? The Green River, Kentucky, archaeological record suggests several proxy measures that can be used to assess the timing, pace, and spread of exclusive, communal property rights, including anthropogenic land management, development of new technologies, and domestication of indigenous plants.

Crothers, George [61] see Peres, Tanya

Croucher, Karina (University of Bradford, UK)

[139] *Living with the Dead: Plastered Skulls and 'Continuing Bonds'*

This paper considers the phenomenon of plastered skulls from the Neolithic of the Middle East, exploring a reinterpretation of evidence. Plastered skulls result from the burial and later retrieval of crania, onto which is sculpted a face using plaster. These were then used and displayed within household contexts. Rather than traditional interpretations which revolve around status and hierarchy or social cohesion, this paper suggests a reinterpretation based on the modern bereavement theory of "continuing bonds." This paper suggests that grief and mourning may be a more appropriate explanation for the phenomenon, and examines the role that contemporary theories of grief might play in the interpretation of (some) ancient funerary remains.

Crow, Kaitlin (New York University), George J. Micheletti (University of Central Florida) and Terry Powis (Kennesaw State University)

[9] *From the Known to the Unknown: Exposing a Middle Preclassic Maya Power Structure at Pacbitun, Belize*

The Middle Preclassic (900–300 BC) is known as a time for developing complexity in Maya society. The most perceptible evidence of this development is exhibited in the construction of the earliest forms of monumental architecture. However, for areas like the Belize River Valley, these structures are uncommon and poorly understood. Now, with the discovery of a large Middle Preclassic platform at the site of Pacbitun, we have the opportunity to increase our understanding of early monumental constructions that brought communities together and established power structures within Maya culture. Over the last few years, the Pacbitun Regional Archaeological Project (PRAP) has worked to uncover this large ceremonial structure dubbed El Quemado, which was found buried beneath Plaza A in the site core. Excavations of El Quemado continue to assess the structure's dimensions and orientation and search for its earliest architectural form. Our investigations have also begun to explore the use of the area around the temple to identify potential adjacent sub-plaza structures. This paper will summarize our research to date and our latest excavations of El Quemado and Plaza A to provide a new understanding of public ceremonialism during a critical developmental period of political and social structures at Pacbitun.

Crowell, Travis (Simon Fraser University), Dana Lepofsky (Simon Fraser University) and Daryl Fedje (University of Victoria)

[49] *Following the Shore: Refining Late Holocene Sea-Level Change through Settlement Histories on Northern Quadra Island, British Columbia*

For people who rely on the ocean, changes in sea-level can have a profound effect on daily lives, connections to place, and identity. When we study sea-level from a broader or regional scale, we do not require the time and space specificity that is necessary to examine the effect of highly local sea-level change in a particular time and place. Thus, the regional sea-level curves that have been well-refined and developed, may not answer (or allow us) to understand and appreciate what this change had on lived lives, particularly in cases where sea-level changed up to several meters in an instant. Our research will detail how human settlement histories, intimately connected to sea-level, can provide a window into the effect sea-level change has on a finer scale that is not currently provided by broader models. Using an intensive coring and dating program in Waiatt and Kanish Bays, Quadra Island, we propose to evaluate how settlements expanded shoreward as sea-levels fell during the Late Holocene. This research will also serve as a test for coring methodology, and whether it can efficiently provide enough accurate data to be used elsewhere.

Crowley, Brooke [152] see Hixon, Sean

Crowley, Erin (University of Minnesota)

[142] *Subsistence and Political Economy: Dairying and Change in Late Prehistoric Ireland*

Cattle played a critical role in the economic and sociopolitical structure of the Iron Age in Ireland, yet the nature of this relationship is not yet clear. The Irish Iron Age (~500 BC–AD 500) is characterized by scant settlement evidence yet with several large, complex, ceremonial centers. It has been difficult, therefore, to contextualize the nature of social change leading into the Early Medieval Period. The Early Medieval Period (~AD 500–1100) emerged with a fully-developed dairying economy, complex social structures, and social and political value placed on cattle and dairy products. Recently, however, increased archaeological work has uncovered more evidence of Iron Age settlement, agriculture, and industry. Therefore, we must ask, when did the dairying economy develop in Ireland and how did that shape the cultural landscape? This paper questions our traditional assumption that the dairying economy was as a particular feature of the Early Medieval Period and poses alternative ways of understanding the economy of late prehistoric Ireland. Considering the connection between subsistence and political economy, this paper assesses the potential effects of a dairying economy on regional social and political identity.

Crown, Patricia (University of New Mexico)

[130] *The Science and Performance of Ritual Drinking in Chaco Canyon*

Consumption of caffeinated drinks made with cacao and perhaps holly is well documented for Chaco Canyon. Less understood is the context of consumption. Evidence for cylinder vessel production, use, and termination particularly reveals aspects of drinking ritual, including frothing. New compositional analysis demonstrates how Chaco potters decorated pots with post-firing pigments on stucco, permitting repeated decoration and cleansing of drinking vessels. Changes in the sizes, shapes, and contexts of Chacoan drinking vessels reveal rapid shifts in how Chacoans drank caffeinated concoctions and in the associated ritual practice between around AD 900 and 1125.

Crowther, Alison [32] see Boivin, Nicole

Crumley, Carole (Department of Archaeology and Ancient History, Uppsala University)

[324] *Assembling Conceptual Tools to Examine the Moral and Political Structures of the Past*

As recent events demonstrate, power can manifest entirely outside the framework of state hierarchies and beyond their control. Beginning with the premise that tension between competition and cooperation exists in all human societies, we must explore the ways rules and norms permit or deny each, and how both interact with history and changing conditions to forge institutions. Today, new ways to stabilize societies and reduce conflict must be

found. One of the most important conditions for reducing conflict is to ensure inclusive and equitable conditions for everyone, particularly as regards food and water security, personal and group safety, and a satisfying quality of life. The form of governance of such communities and polities goes by many names: anarchist, collective, communitarian, pear-shaped, and many others and dates back thousands of years. These very forms are a perennial moral compass (family, neighborhood, community-based action). They are not left behind in human evolution; on the contrary, they remain the fabric of peaceable, supportive daily life and can still gift the future.

[77] *Discussant*

Cruz, Patrick (University of Colorado) and Samuel Duwe (University of Oklahoma)

[34] *Tewa History and the Archaeology of the Peoples*

According to tradition, soon after emergence into this world the Tewa were split into two peoples—the Summer and Winter—and were tasked with finding the “middle place,” or the location of their eventual historic villages. The Summer People traveled along the Jemez Mountains practicing agriculture, and the Winter People journeyed along the Sangre de Cristo Mountains eating wild game. On their travels southward the people stopped twelve times and these are represented as ancient villages. Eventually the Peoples came together at large sites in the heart of the Tewa homeland. The Tewa view the creation of their society as the amalgamation of disparate people. In light of what we know about the late prehistory in the Southwest—as a time of dramatic reorganization, coalescence, and transformation—is it possible that the Tewa are remembering the coming together of people with different identities, memories, and histories? In this paper we examine the various Pueblo settlements on both the east and west sides of the northern Rio Grande before the coalescence of Tewa society, and seek, through the lens of Tewa cosmogony, to understand the identities of the various peoples who eventually negotiated the Tewa world.

Cruz, Heleinna (Quinnipiac University), Jaime Ullinger (Quinnipiac University) and László Paja (University of Szeged)

[196] *Bone Calcination of Different Age Groups in Cremations from Bronze Age Hungary*

Bronze Age Hungary saw the advancement of trade which may have been a cause of the movement from egalitarian societies to more complex societies with increasing social inequality. Social inequality between regions in Hungary may be reflected in variation among funeral customs. Excavations from Békés 103, a Bronze Age cemetery in southeastern Hungary, have uncovered 68 burials, most of which are cremations. This study focuses on color analysis (identified by Munsell Soil Color Charts) of the burned human bone from 11 cremation urns. Age may play a role in status differentiation, therefore subadults and adults were compared for level of calcination, indicating complete loss of the bone's organic matrix due to the pyre's high temperature. Preliminary results show a possible difference in calcination between subadult and adult cremations. Given that burials with greater calcination may indicate more energy being used in the maintenance of a funeral pyre; this suggests that age may play a role in mortuary behavior. These results may be helpful in understanding funerary customs of the Körös region when compared with the ceramic data associated with the burials.

Cruz Berrocal, Maria (Zukunftskolleg, Universitaet Konstanz)

[36] *The Church of Todos los Santos and Its Associated Cemetery in the Spanish Colony of San Salvador, Heping Dao, Taiwan (Seventeenth Century)*

Archaeological excavations in the setting of the former Spanish colony of San Salvador, founded in 1626 in current Hoping Dao, northern Taiwan, have uncovered remains of a European building that can be identified as the Convent or Church of Todos los Santos, founded while the Spanish colony was active and possibly preserved afterward under Dutch rule. Several burials have also been excavated, which constitutes a formal cemetery associated to the church. The human remains in the cemetery of Todos los Santos include both native and European individuals. This paper discusses the findings and their relevance in the context of the archaeology of early colonialism in Taiwan and the region, since this kind of remains have not often been discovered. This discussion will deal with the scope of European establishment in the region.

[36] *Chair*

Cruz-Palma, Jorge [13] see Acosta-Ochoa, Guillermo

Cucina, Andrea [140] see Chatters, James

Cuellar, Andrea (University of Lethbridge)

[220] *Social Differentiation and Hierarchy at a Central Place in the Eastern Andes of Ecuador*

This paper focuses on the development of a central place in the Quijos Valley, Eastern Andes of Ecuador. Based on an intensive survey of the site complemented by small excavations, I offer a spatial, demographic, social, and economic characterization of this central place with the goal of discussing and contrasting views on the development of social differentiation, hierarchy, and centralized political authority in ancient chiefdoms. Contextualizing this in a body of regional settlement pattern information available for the Quijos Valley also permits the comparison of conclusions drawn from data corresponding to different scales of analysis for this case as well as for others in Northern South America.

Cuenot, Jean-François [131] see Nondédéo, Philippe

Cuevas, Mauricio (Universidad Veracruzana)

[10] *La aplicación de esquemas de comunicación en las investigaciones de rutas terrestres: Un caso al Este de Los Tuxtlas*

El estudio de las rutas de comunicación nos permite tener un mayor conocimiento de las sociedades prehispánicas, aspectos como dinámicas de transporte, comercio, conexión entre sitios arqueológicos, aprovechamiento del terreno o inclusive creencias compartidas. La aplicación de la teoría de la comunicación puede ser clave para plantear trabajos en los cuales se busque reconstruir las rutas en regiones donde no se cuente con evidencias visibles de éstas. La propuesta teórico-metodológica que aquí se presenta utiliza un esquema de las teorías de la comunicación y se aplica para crear un modelo de reconstrucción de posibles rutas prehispánicas junto con herramientas y técnicas como los son sistemas de información geográfica, modelos digitales de elevación, comparación de rutas y veredas contemporáneas y evidencia arquitectónica prehispánica registrada durante las exploraciones hechas en campo por parte del Proyecto Arqueológico de Piedra Labrada Sierra de Santa Marta, Los Tuxtlas, Veracruz, (PiLaB).

Cui, Jianfeng, Guoxiang Liu and Runan Ni

[26] *Roman Glass Beads Found in Hulunbir, Inner Mongolia, China*

In this study, we present some sandwich glass beads found in Hulunbir, Inner Mongolia, China. According to the chemical analysis, these beads are also soda-lime glass with very low Al, Mg and K contents. And the beads are transparent, which is due to the Mn²⁺ decoupling technique used. Compared with the data published, the beads were much likely from the area ruled by Roman Empire.

Cui, Jianfeng [26] see Chiou-Peng, TzeHuey

Cui, Jianxin (Shaanxi Normal University) and Hong Chang (Institute of Earth Environment, CAS, China)

[99] *Culture Prosperity of Late Longshan on North Shaanxi and Its Environmental Background*

The late Longshan culture of north Shaanxi was flourishing, while that of the southern Inner Mongolia was declined and migrated to the south. Meanwhile, in Guanzhong Basin, the culture was also declined to the bottom. In this paper, we aimed to know the possible climatic factors drove the occurrence of these culture phenomena. A compile of Holocene climate records related to these three regions were collected and analyzed. The following results can be drawn: after 4.4 Ka BP, the climate of Inner Mongolia was becoming colder and drier which could not support the agriculture subsistence again and the people therefore migrated to the north Shaanxi along the Yellow River. Second, a generally drier and cooler climate with intermittent warmer, wetter conditions developed in north Shaanxi during the mid-fourth millennium BC. This short warm and wet event (4.0–3.8/3.7Ka BP) attributed the prosperity of late longshan culture at this region. While the climate of the Guanzhong Basin and the North China Plain was warm-humid and extreme flooding events occurred frequently. The spatial distribution of culture was limited by the frequent floods and there was obvious decrease of the site numbers. In conclusion, people made diverse response strategies corresponding to different environmental background.

Cullen, Sara (University of Colorado Boulder)

[345] *In Search of "False Alibates": A Quagmire in Chert Sourcing from Northeastern New Mexico*

Applications of elementally sensitive geochemical methods have made it possible for archaeologists to identify chert sources with more provenance accuracy than previously possible. Alibates dolomite from quarries in the Texas Panhandle is commonly identified in Southwest sites as evidence for trade with Southern Plains communities. However, regional archaeological research suggests the presence of an Alibates "look-alike" chert outcrop in northeastern New Mexico, near the Baldy Hill formation north of Folsom. This poster will examine the case study of Baldy Hill chert as it pertains to archaeological studies regarding lithic procurement and Plains-Pueblo interactions in far northeastern New Mexico and southeastern Colorado.

Culleton, Brendan [9] see Kennett, Douglas J.

Culley, Elisabeth (Arizona State University)

[210] *A Comparison of "Scenes" in Parietal and Non-Parietal Upper Paleolithic Imagery: Formal Differences and Ontological Implications*

Upper Paleolithic cave art is well-known for its skilled execution, specifically the use of shading, relief, and perspective to render lifelike depictions of Pleistocene fauna. Cave art is equally well-known for a near absence of flora, humans, and scenes. In this regard, parietal imagery is distinct from "art mobilier," where these are more common. However, defining "scenes" as a graphic phenomenon can be problematic, and identifying them among superimposed and fragmented images more so. Definitions based on how scenes are perceived offer some guidance and include more imagery than previously recognized; frequencies allow the comparison of scenes from different contexts. This paper evaluates differences in the nature of scenes as depicted on rock walls and on objects in France from ~40–11 kya. Differences in the frequency, in the types and range of constituent elements, in the degree of detailing or conceptual ambiguity, and in the type and extent of audience engagement with scenes are all considered. Emphasis is placed on the potential social consequences of scenes from different contexts. Consequently, while exploratory and qualitative in nature, the analysis points to avenues through which ontological differences in the production, use, and sociocultural role of Upper Paleolithic imagery can be specified.

Cullon, Deidre (University of Victoria, Dept. of Anthropology PhD Cand.), Rhy McMillan (Pacific Centre for Isotopic and Geochemical Research) and Heather Pratt (Golder Associates)

[49] *Archaeological Fish Traps on the Coast of British Columbia*

Fish traps are a ubiquitous fishing feature on the Northwest Coast, with thousands of features recorded at hundreds of sites. This fishing technology represents a use and modification of intertidal and riverine environments at an industrial scale, yet protocol and management practices ensured that fish populations flourished. As in other areas of the Northwest Coast, First Nations and archaeologists in British Columbia have documented fish traps, resulting in the registration of 822 fish "trap" or "weir" sites at the provincial Archaeology Branch. These represent more than 94% of all recorded fish traps sites in the province. Our review of this archaeological dataset is presented, revealing a wide distribution of fish traps, varying trap design, and differing modes of construction. Dating from as early as 4500 cal 14C years BP to the early twentieth century when they were banned, fish traps in British Columbia represent an innovation that was integral to those living on the Northwest Coast and they remain important to our understanding of late Holocene fish management practices.

Cullon, Deidre [47] see McMillan, Rhy

Culquichicón-Venegas, María José and Aleksa Alaica (University of Toronto)

[178] *Social Dynamics of the Past through the Body of the Camelid: Utilizing Evidence from Late Moche Peru*

Assessing social dynamics in the past through archaeometry is more readily possible by constructing questions that more actively engage with issues beyond subsistence and technology. As archaeologists we are capable of reaching these higher-level interpretations of the past. In this paper, the use of camelid age profiles will bring insights into the kinds of value placed on the camelid body and the kinds of constraints and affordances that camelid herds would have placed on the Late Moche community of Huaca Colorada (AD 650–850). By considering the contribution of ethnographic accounts from herding communities of the Andean region, we are better equipped to interpret material correlates. Zooarchaeology and social archaeology can be better integrated through the goal of understanding how the actions and activities surrounding camelid herding were impacted by and influenced community organization and worldview. This paper will argue that the varied use of different aged camelids corresponds to specific value placed on the life stages of these animals. By considering camelids as active agents in the social dynamics of the past we are achieving a more complete picture of the exchanges that would have occurred within everyday and ceremonial contexts.

Cummins, Tom

[391] *A Reconsideration of Mold-Made Ceramics in Coastal Ecuador: Chorrera and Jama Coaque*

Based on an examination of ceramic Chorrera, Jama Coaque and La Tolita figurines from the coast of Ecuador, this talk discusses the central role of the mold as both a forming technique and as a means to create a stable visual tradition from generation to generation. It will also suggest the impact on later traditions on the coast, such as the Moche tradition.

Cunнар, Geoffrey (WCRM), Ed Stoner (WCRM) and Tom Bullard (Desert Research Institute)

[140] *Searching for the "Paleoarchaic Individual" and Unique Paleoarchaic "Production Grammar" in the Great Basin*

Archaeological investigations were conducted by Western Cultural Resource Management in the Fire Creek Archaeological District in the central Great Basin. We address the results of investigations at a Paleoarchaic site containing a buried soil with both an abundant stemmed point trajectory and a Levallois-like reduction method dating to the Younger Dryas. Employing agency theory and through an examination of depositional history, the chaîne opératoire and spatial analyses, we argue that the artifacts located both on the surface and in the buried soil are indicative of activities conducted in a moment in time and not a palimpsest accretion. Components of the chaîne opératoire are discussed and the identity of the Paleoarchaic occupants is examined within the broader regional context of the Great Basin. Further the identification of ancient soils on Great Basin alluvial fans and the ramifications for future archaeological work in such contexts is addressed.

Cunнар, Geoffrey [376] see Stoner, Edward

Cunningham, Alastair [333] see Marwick, Ben

Cunningham, Jerimy (University of Lethbridge)

[314] *Discussant*

Cunningham-Smith, Petra (University of Florida), Ashley Sharpe (University of Florida), Elizabeth Olson (Northern Illinois University), Erin Thornton (Washington State University) and Kitty Emery (Florida Museum of Natural History at University of)

[5] *Old Dogs, New Tricks: Tracking Dog Management in the Ancient Maya World*

This study examines the management of dogs as a resource and status symbol in ancient Mesoamerican society. One of the few New World domesticated animals, dogs provided communities with a steady source of meat. Artistic and ethnohistorical accounts suggest that dogs may also have been selectively bred to emphasize particular body shapes and hair types, including even absence of hair. These different breeds are described as playing different roles, as participants in specific ceremonies, as hunters, as companions (in life and death), as healers, and as favored foods. To date, however, archaeological evidence verifying the iconographic and historic record has been sparse. This study reviews chronological and spatial evidence of dog remains in different archaeological contexts, using morphometric and stable isotopic data to gain an understanding of the types, uses, and movement of dogs and dog breeds. An abundance of dog remains in Preclassic period contexts in comparison to Classic contexts, as well as evidence of higher than expected breed and dietary diversity throughout the Classic period suggests that the role dogs played in social and subsistence practices across the region varied over time, and that intensive dog breeding was much more specialized than previously assumed.

Curet, L. Antonio (National Museum of the American Indian, Smithsonian Institution)

[289] *Island Hopper: Theodoor de Booy and Archaeology in the Caribbean*

Like many other regions, the colonial experience in the Caribbean included the arrival of foreign archaeologists, mostly from the United States or Europe representing museums, universities, or scientific academies forming what has been called "imperial science." The objects, specimens, and archival documentation gathered during their research were taken back to their countries and today form part of major collections in museums throughout the world. Theodoor deBooy of the Museum of the American Indian (MAI) was one these early foreign scholars working in the Caribbean. He collected thousands of objects and created a large photographic collection during at least 13 expeditions throughout the region. With the breadth of work he conducted, de Booy could easily be considered the leading specialist of Caribbean archaeology of his time. Unfortunately, despite his successful career, his role in Caribbean archaeology and the quality of the collections he obtained are greatly underestimated by scholars working in the region. This paper discusses the nature of de Booy's traveling and research throughout the Caribbean, from Cuba and Jamaica to Venezuela, and characterizes the collections he obtained in these endeavors. The impact of de Booy's projects, collections, and publications on the archaeology of the region will also be discussed.

Cureton, Travis [105] see Garraty, Christopher

Curran, Joseph (Cal State LA), David Raymond (Cal State LA) and Timothy Curran (Cal Poly Pomona)

[300] *The Impact of War Clubs: An Interdisciplinary Analysis of Conflict*

This research focuses on the transformation of conflict from its earliest modes to more intensified forms seen in complex societies. Specifically, the focus is on the transition of combat in band level societies to its institutionalization in tribal social structures. One of the challenges in archaeology is in recognizing steps in the evolution of violence in formative and less stratified societies. To achieve this end, the transition of conflict needs to be operationalized. This investigation analyzes the impact of specialized weaponry (i.e., clubs) indicative of the earliest signs of escalating warfare in California. Working with forensic scientists and biomechanical engineers, experiments with traditional war clubs from a number of tribal societies are conducted to derive quantifiable data on lethality. The analysis focuses on the reconstruction of weapons from historic accounts and museum specimens, tested using biomechanical engineering methods. The results of the test are related to the bioarchaeological record and specific case studies for blunt force trauma in California to connect the data to observations in the prehistoric past. This relation allows for the charting for the early development of conflict centered, social organizations.

Curran, Timothy [300] see Curran, Joseph

Currie, Elizabeth (Department of Archaeology, University of York, UK)

[222] *The Antiquity and Persistence of Traditional Health Beliefs and Practices in the Northern Andes*

This paper presents findings of a new European Community funded research project: "Indigenous Concepts of Health and Healing in Andean Populations." The study population is indigenous Quechua peoples in northern Andean Ecuador. The project examines ethnic Andeans' understanding of their world and how health, illness, and healing are understood within it. Current practices of traditional medicine (TM) have evolved within complex historical contexts into new forms which can reveal the nature of precolumbian and historical indigenous belief systems. They might demonstrate how beliefs and associated rituals and practices adapted and survived in social climates of persecution and repression. The project employs novel theoretical

and methodological approaches, using a time-depth perspective and a framework of interdisciplinary methods integrating archaeological-historical, ethnographic and modern health sciences approaches. It will model how peoples survive and adapt their traditional belief systems in a context of alien cultural impacts and determine what survives of pre-European Amerindian systems of knowledge and medicine in indigenous Andean cultures now, and the continuing role, relevance and use of TM in present-day communities. This approach highlights a culturally sensitive approach to the conservation of Andean "intangible cultural heritage."

Curry, Gavin [305] see Fadem, Cynthia M.

Curtis, Matthew (UCLA Extension and UCLA Cotsen Institute of Archaeology)

[309] *Revisiting the Ancient Ona Culture of Eritrea: What Previous Research from the Asmara Plateau Might Offer for New Understandings of the First Millennium BCE in the Northern Horn of Africa*

Sustained archaeological research on the Asmara Plateau of Eritrea occurred between 1998 and 2003, producing important initial efforts in ceramic and lithic artifact typologies, subsistence reconstruction, and regional perspectives in landscape use and settlement patterns dating to the first millennium BCE. Researchers identified a distinct regional cultural expression termed the Ancient Ona Culture. This paper reviews the key qualities of the Ancient Ona Culture and argues that, while distinct in a number of aspects, the Ancient Ona Culture may be seen as a localized expression of a wider regional cultural expression in the highlands of the northern Horn. Given the cessation of international research in the Asmara Plateau since 2003, it is crucial to revisit insights from previous research in Eritrea, relating these to new understandings of the archaeology of the first millennium BCE from research conducted over the last two decades in Tigray Ethiopia. This paper outlines ideas for accomplishing such an endeavor.

Curtis, Matthew [21] see Arthur, John

Cush, Patricia and Richard Callaghan (University of Calgary)

[296] *Continuity and Evolution in the Taiwanese Sailing Raft*

The Taiwanese or Formosan sailing raft likely has considerable antiquity as well as geographic distribution on the coasts of China, Taiwan, Vietnam, and possibly as far south as the Coromandel Coast of India. The Taiwanese version is the most studied and may have the longest continuous evolution into the twentieth century. These seagoing craft were initially constructed from bamboo, equipped with lug sails, and steered using center boards in a very sophisticated manner. Analysis of their performance characteristics shows that they had considerable maneuverability, which along with the shallow draft allowed them to function well in seas with numerous sandbanks, reefs, and shoals. A great many of these vessels were registered for fishing in Taiwan in the mid-twentieth century. With the demise of the giant bamboos on Taiwan during the latter part of the twentieth century and the introduction of new technologies, the sailing rafts evolved but still retained some of their traditional elements. Along with a discussion of the history and performance of the sailing raft we present excerpts from an interview with the last of the craftsmen building the rafts at the beginning of the twenty-first century.

Cushman, David

[255] *Discussant*

Cuthbertson, Cory [100] see Hoggard, Christian

Cuthbertson, Cory (Centre for the Archaeology of Human Origins, University of Southampton) and Christian Hoggard (Centre for the Archaeology of Human Origins, University)

[287] *Stones, Shapes and Speech: Interpreting the Origins of Language from Lithic Variation with Geometric Morphometrics*

Results from a recent experiment demonstrate that morphological standardization is an indicator of complex cultural transmission and cognition. A novel methodology integrating geometric morphometrics and Multiple Factor Analysis was employed to assess global shape variance in four experimental hand ax assemblages made by novice knappers trained under four different simulated social learning environments (emulation, imitation, silent teaching and verbal teaching). The higher the fidelity of their learning environment, the lower the morphological variability the assemblages exhibited. High fidelity social learning methods require theory of mind (the ability to think about thoughts), which is correlated with specific linguistic traits that scaffold its development. Therefore archaeological assemblages that exhibit high levels of standardization might only be possible when transmitted through high fidelity cultural transmission, in communities that operated with a theory of mind and linguistic skills. One hundred and four hand axes had 2D outline coordinate data taken for their planar, lateral, and superior view. A Multiple Factor Analysis then observed the three concatenated datasets. Hand axes in the low fidelity group (emulation) demonstrated the largest range of variation, while the high fidelity groups (teaching) demonstrated the lowest range of variation. The methods were also able to successfully discriminate between the four groups based on their shape variance.

Cutright-Smith, Elisabeth (Shasta-Trinity National Forest)

[255] *Discussant*

Cutts, Russell [153] see Miller, Catherine

Cvinar, Amanda (Los Alamos National Laboratory, Adams State University)

[122] *Using the NHL Framework to Advance the Development of Applied Archaeology*

In 2016, the National Park Service celebrated its centennial anniversary thus reminding the public that places of historical significance matter to our national cognizance. Using the National Historic Landmark designation as a means for public education, this paper draws upon my master's thesis project, which focuses on building a bridge among CRM, research, and public education at the national level. It serves as a model for how graduate-level, archaeological training contributes to traditional archaeological knowledge, public awareness of the past, and CRM compliance requirements. The Mortandad Cavate Complex and associated Sandia Pueblo compose a site complex located within the boundary of Los Alamos National Laboratory, a Department of Energy managed facility located in Northern New Mexico. This site complex exhibits an exceptional level of preservation and integrity. It is affiliated with the traditions of the Pueblo de San Ildefonso and represents a place of special cultural and traditional value. It is one of four Ancestral Pueblo cultural properties that the Department of Energy plans to nominate as National Historic Landmarks. The relationship among compliance regulations, public education, the traditions of Pueblo de San Ildefonso, and archaeological knowledge of the site serves as a model for the development of applied archaeology.

Cybulski, Jerome [176] see Malhi, Ripan

Cyphers, Ann [10] see Arieta Baizabal, Virginia

Czermak, Andrea [30] see Fernández-Crespo, Teresa

Dagneau, Charles [178] see Loewen, Brad

Dahlstedt, Allisen (Arizona State University) and Jane E. Buikstra (Arizona State University)

[143] *A Bioarchaeological Survey of Skeletal Tuberculosis in Prehistoric Southern Peru*

Recent studies of precolumbian *Mycobacterium tuberculosis* complex (MTC) genomes identify pinnipeds as a source of human tuberculosis in South America (Bos et al. 2014). These results raise questions regarding the timing of this zoonotic transfer and the subsequent human host adaptation and dissemination of *Mycobacterium tuberculosis*. Here we present a survey of skeletal tuberculosis throughout the Osmore Drainage of southern Peru, where the pinniped to human "jump" had occurred by ~AD 1000. This sample includes individuals interred within coastal and inland sites occupied between 385 BC and AD 1475. We explore patterning of disease across age at death and sex, as well as changes in skeletal expressions across time and space. We then address the hypothesis that *M. tuberculosis* manifested similar skeletal expressions in humans living in precolumbian South America as it did in Europe prior to antibiotic treatment. The results of this study have implications within the fields of bioarchaeology and genomics for understanding the origin and spread of skeletal tuberculosis in the Americas.

Dai, Xiangming

[99] *Shimao: The Prehistoric Pioneer of Rising States in Northern China*

In ancient China, a number of ethnic groups and polities rose and declined in northern China. The competition and wars between these frontier polities and Central-Plain dynasties occurred frequently in Chinese history. A series of new archaeological discoveries in recent years have revealed that Shimao was the first state-level society emerging in northern China. The Shimao social group was mainly distributed in the Ordos region, where the social complexity experienced a leaping development in late prehistory, and this social evolutionary trajectory is very different from the Central Plain. The rising of the Shimao state started a new model of social development for the following history in northern China. This paper will discuss the background and process of the rise of the Shimao state, and compare some similar phenomena in history.

Dakovic, Gligor (Belgrade University/University of Pittsburgh), Bonnie A. B. Blackwell (Williams College, Williamstown, MA), Dušan Mihailovic (Department of Archaeology, Belgrade University), Mirjana Rokсандić (University of Winnipeg) and Anne R. Skinner (Williams College, Williamstown, MA)

[181] *ESR Dating Ungulate Tooth Enamel from the Mousterian Layers at Pešturina, Serbia*

In southern Serbia, Pešturina contains three Mousterian layers, with late Pleistocene faunas. The site overlooks a tributary to the Nišava River southwest of Niš near the Sičeva Gorge. In all three sedimentological layers, the large mammalian faunas suggest a mixed environment with temperate forest, rocky cliffs, and steppe within walking distance from the cave. Fragmentation patterns and butchering marks plus the lithic tools indicate that some faunal remains were human kills. A depositional hiatus occurred between Layers 4 and 3. From 14 ungulate teeth from the Mousterian layers, 50 enamel subsamples were independently ESR dated. With < 0.1 ppm U in the enamel, and 1.0–3.5 ppm dentinal U, the ESR ages do not depend on the U uptake rates used for the calculations. Nor does any potential Rn loss introduce any uncertainty. To assess the external dose rates, bulk sediment samples and individual mineralogically distinct components were analyzed by NAA, then volumetrically averaged, while time-averaged cosmic dose rates were calculated using the ramped box method. At least two teeth had been reworked, likely associated with the erosion event that removed part of Layer 4 before the deposition of Layer 3. ESR ages correlated with Marine (Oxygen) Isotope Stages (MIS) 3–6.

d'Alpoim Guedes, Jade (Washington State University) and Kyle Bocinsky (Crow Canyon Archaeological Center)

[27] *Modeling the Spread of Crops across Eurasia*

Understanding the routes and the timing of the spread of western Eurasia domesticates to Asia and of Asian domesticates to Europe and the Near East has become an increasing focus of research. To date, however, we have had little understanding of the types of constraints that farmers may have faced as they moved these domesticates into the challenging environments of Central Asia. The spread of many of these domesticates also took place during a time of marked climatic change. Although it has been hypothesized that these climatic changes may have impacted the nature and the manner of the spread in East Asia, a dynamic model of how crop niches changed throughout time has not yet been applied to Eurasia. This paper describes the creation of a multimillennial thermal model that compliments Naomi Miller's pioneering work on outlining how patterns of rainfall limited the spread of millets.

[177] *Chair*

d'Alpoim Guedes, Jade [177] see Habiyaemye, Cedric

d'Alpoim Guedes, Jade [177] see Hanson, Sydney

Dalpra, Cody

[304] *Landscape Importance in Northern Arizona: An Application of Ethnographic Voices and Quantitative Viewshed Analysis*

The importance of landscapes has long been discussed in archaeology, yet this is an often overlooked line of evidence. Landscapes often have a primary role in Native American oral histories and stories. Humans in general have a tendency to attach strong social meanings to visually prominent landforms. Such meanings are embedded within cultural landscapes as networks of natural and constructed places are perceived and made meaningful by communities. The Colorado Plateau of Northern Arizona features a vast landscape of mesa, canyons, and mountains that allows for an ideal test for incorporating these ideals into archaeological interpretation. Petrified Forest National Park (PEFO) near Holbrook, Arizona, allows for such comparisons with its extensive site database. This research focuses on applying the importance of these ethnographic meaningful landscapes from Puebloan groups to documented sites within PEFO. By examining sites of variable size representing both sides of the Pueblo III to Pueblo IV transition in relation to the

landscape, a clearer picture of how landscapes are vital to archaeological interpretation emerges. Three case studies demonstrate how viewshed analysis allows for a qualitative and quantitative measure of connection to the landscape as described by Hopi, Zuni, and Navajo ethnography.

Dalton, Jordan and Nathaly Damián Domínguez (Licensed Peruvian Archaeologist)

[232] *Inca Presence at Las Huacas, Chincha Valley*

When the Spanish arrived to the coast of Peru they heard stories of the wealthy Chincha Kingdom and the privileged position that they enjoyed within the Inca Empire. Previous archaeological and ethnohistorical research has concluded that at the Chincha Kingdom's capital of La Centinela, the Inca rulers set up their authority alongside the local lord, and that they left him in charge of ruling the rest of the valley. This poster will present recent research conducted at the site of Las Huacas, a 60-hectare site located 10 km away from La Centinela in the prime agricultural fields of the valley. Based on architectural features and preliminary ceramic analysis this poster will argue that the Inca intervened in activities at Las Huacas. It will then explore what this new evidence on the Chincha case adds to understanding the specific type of indirect rule that the Inca set-up in the Chincha Valley. Furthermore, it will interpret the function of Las Huacas within the Chincha Valley and the Inca Empire as a whole. Excavations this past summer encountered large quantities of botanics and artifacts from diverse types of craft production, leading to the interpretation that structure N1 at Las Huacas was a multifunctional structure.

Damgaard, Peter de Barros (Center for GeoGenetics, University of Copenhagen), Jeremy Choin (Center for GeoGenetics, University of Copenhagen), Andrzej Weber (Department of Anthropology, University of Alberta), Martin Sikora (Center for GeoGenetics, University of Copenhagen) and Eske Willerslev (Center for GeoGenetics, University of Copenhagen)

[330] *Ancient Genomics of Neolithic to Bronze Age Baikal Hunter-Gatherers*

Genome-wide data from hunter-gatherer populations of the Upper Paleolithic to Neolithic has provided unprecedented insight into the human evolutionary and demographic trajectory. However such datasets have hitherto been largely confined to Western Eurasia. The sole representative of Inner Asian past populations post-dating the split between paleolithic Europeans and Asians, as well as paleolithic Siberians and East Asians, are the Mal'ta and Afontova Gora individuals, the Ancient North East Asian (ANE) branch, clouding the dating of the population split, and subsequent admixture events, between ANE and East Asian hunter-gatherers. Our genome data (~1X) reveal that Baikal Hunter-Gatherers (BHG) are an uncharacterized genetically homogeneous branch of Inner Asian hunter-gatherers, displaying highest shared genetic drift with present-day East Asians. Targeted sampling strategies coupled to excellent biomolecule preservation has permitted the generation of an advantageous sample size dataset (n = 31), rendering possible to estimate allele frequencies within these groups, thereby optimizing population tests. BHG model as an excellent proxy for an Inner Asian source population admixing into the late Bronze Age Andronovo groups, becoming Iron Age steppe nomads. With genomes allowing for kinship analyses, pathogen detection and strontium ratios, coupled to archaeological interpretative approaches we extend possible means to elucidate behavioral processes and cultural transformation.

Damián Domínguez, Nathaly [232] see Dalton, Jordan

Damick, Alison (Columbia University)

[74] *Leaving the Blanks Unfilled: A Case Study in Productive Ambiguity from Early Bronze Age Lebanon*

An oft-heard sentiment in prehistoric archaeology, particularly for contexts without traditionally visible indicators of gender (i.e., bodies or identifiable representations of bodies), is that "the evidence just isn't there" to productively introduce intersectional gender research. This is partly due to the trend-sensitivity of archaeology, which often draws from other disciplines to supplement its own scope. Intersectionality is used in the same way, as archaeologists attempt to reframe their practice and interpretation with intersectional approaches derived from critical theory. Disrupting preconceived assumptions about identity categories is undoubtedly imperative and powerful; this paper, however, interrogates whether we might see archaeology as itself offering important tools for this process, and what opportunities those tools present for broadening intersectional thinking. Perhaps in cases where the "evidence" seems to be "missing," we can rather see invitations to think otherwise about the constitution of evidentiary categories. What happens when, instead of seeking markers of what a body is, we instead interrogate the "absences" through which embodied identities are continuously in production? Rather than stressing its limitations, this paper investigates what is introduced by ambiguous and contradictory evidence, by examining the (sometimes "absent") archaeological evidence for changing social differentiation in Early Bronze Age Lebanon.

Damitio, William (Washington State University) and Shannon Tushingham (Washington State University)

[194] *Pipes and Smoking in Precontact Pacific Northwest North America*

Smoking has been practiced by native peoples throughout the inland Pacific Northwest—and especially along the Columbia and Fraser River systems—for several millennia. This is evinced by the presence of stone pipes and pipe fragments in sites across the region. This poster presents the spatial and chronological distribution of archaeological smoking pipes throughout the inland Pacific Northwest based on literature and database searches, with a particular focus on those collections held or formerly held by the Washington State University Museum of Anthropology. In addition, the results of chemical residue analyses determining the material smoked in a number of pipes and pipe fragments from sites spanning the region will be reviewed, including the results of new testing by the authors. The research, developed in collaboration with indigenous communities in the USA and Canada, sheds light on the practice of smoking in the past and addresses questions relating to pipe form and distribution and the traditional use and management of smoke plants throughout the Pacific Northwest.

Damm, Jacob (UCLA—Cotsen Institute)

[240] *Consumption Preferences at the Collapse of Empire: The Case of New Kingdom Jaffa*

The site of Tel Yafo (modern Jaffa, Israel) provides unique insight into the tenure of the Egyptian New Kingdom empire in the Levant (ca. sixteenth–eleventh centuries BCE). As attested to in both ancient documents and by the presence of Egyptian monumental architecture, Jaffa functioned as an important imperial center. As the empire waned, Jaffa persisted as one of the last Egyptian holdings in the region. Recent excavations by the Jaffa Cultural Heritage Project (JCHP) have opened this final period to scrutiny by uncovering a series of narrowly dated occupation and destruction levels within the city's gateway. Through close examination of the ceramic data generated by these excavations, it is possible to detect both gradual and punctuated shifts in the character of the assemblage wherein there is a diachronic decrease in the consumption of imported and locally produced Egyptian ceramics. When considered contextually, these shifts correlate with violent episodes at the site, culminating in the complete disappearance of Egyptian-style forms from the material record. Indeed, the C14-derived absolute chronology of each phase allows for the assessment of consumption preferences in both functional and symbolic ceramic categories at an almost generational level as individuals negotiated the end of Egyptian imperial control.

Dan, Anca [221] see Schlotzhauer, Udo

D'Andrea, A. Catherine (Simon Fraser University)**[171]** *Historical Ecology: An Approach to the Investigation of Ancient Human-Environmental Interactions in the Horn of Africa*

Recent archaeological survey, excavation, ethnoarchaeological and paleoenvironmental research conducted in northeastern Tigray by the Eastern Tigray Archaeological Project (ETAP) has produced new insights into the Pre-Aksumite and Aksumite periods (>800 BCE–CE 700). The principal ETAP excavations thus far include the Pre-Aksumite site of Mezber (1600 BCE–1CE) and Ona Adi (c. early first millennium CE) which was inhabited during the Pre-Aksumite to Aksumite transition. Both sites were occupied during times of widely ranging cultural developments. This paper will provide the archaeological and paleoenvironmental context for a new ETAP interdisciplinary partnership which is investigating what role, if any, environment and human-environmental interaction had in the 1) origins of social complexity during the Pre-Aksumite period; and 2) the Pre-Aksumite to Aksumite transition. Archaeological, paleoenvironmental and traditional knowledge studies are being integrated within a framework of historical ecology. By coupling environmental and archaeological records for more than one time period and polity with traditional agricultural knowledge, we are investigating alternate pathways of societal interactions with the environment.

[171] *Chair*

D'Andrea, A. Catherine [171] see Terwilliger, Valery

Daneels, Annick J. E. (IIA-UNAM Mexico)**[217]** *Palaces at La Joya, Classic Period Central Veracruz: Architectural and Ideological Evidence*

La Joya was the capital of a very small state during the first millennium AD in South Central Veracruz. This region is rarely associated with major political power, though obviously it was of high prestige in the Mesoamerican world in terms of the distribution of the paraphernalia associated with the ballgame ritual. Two contemporary monumental platforms at the site can be interpreted as palaces, with administrative, residential, ritual, and service areas, one possibly housing a political and the other a religious ruler. Besides architectural layout, evidence rests on the urban setting, the monumentality and quality of construction, the presence of a sumptuary burial in a commemorative pyramid, the recurrence of sacrificial deposits for building consecration, and a large termination sacrifice that may be interpreted as a lineage extermination act.

[320] *Discussant*

Daniel, I. Randolph [364] see Hill, Kristina

Daniels, Megan (University of Puget Sound), Justin Leidwanger (Stanford University), Elizabeth Greene (Brock University) and Numan Tuna (Middle East Technical University)**[240]** *A Finer View of Regional Sociopolitical and Economic Change in the Southeast Aegean: Ceramic Production along the Datça Peninsula*

Situated along the dramatic Datça Peninsula in southwest Anatolia, the port-town of Burgaz provides a flourishing landscape of ceramic production and valuable case study for investigating the intersection of local dynamics and larger Mediterranean social, political, and economic shifts. During the Archaic and Classical periods Burgaz developed into a thriving commercial and cultural center by virtue of its proximity to fertile land and centrality within the Gulf of Hisarönü. From the mid-fourth century, while the focus of civic life shifted westward to the expanded urban center of (New) Knidos, Burgaz transformed into a local agricultural and industrial nucleus connected to Knidos and beyond into the increasingly cosmopolitan early Hellenistic world. This paper presents the results of comparative visual, chemical, and mineralogical analyses of ceramics from Burgaz and several smaller settlements and workshops around the peninsula, arguing for expanding and export-oriented production from the fourth century onward. Analyses of the transport jars and other pottery suggest that local settlements had now integrated into a regional economy and tied their fortunes to the larger export market at Knidos. Such abrupt and fundamental changes in livelihoods across Datça shed light on how local communities responded to new realities of the Mediterranean-wide network.

Darwent, John (University of California, Davis), Genevieve LeMoine (Peary-MacMillan Arctic Museum and Arctic Studi), Hans Lange (Nunatta Katersugaasivia Allagaateqarfialu, Greenla) and Christyann M. Darwent (University of California, Davis)**[144]** *lita before the Fall: Mitigation of a Unique Stratified Site in the High Arctic of Greenland*

lita (Etah), which sits on the north shore of Foulke Fjord in northwestern Greenland, in many ways could serve as a poster child for climate-change–driven destruction of coastal sites. Sitting on an alluvial fan at the base of a steep-sloped kame deposit, the site has rich historic and late prehistoric occupations visible on its surface. But more uniquely for the high Arctic, there are also 1,000 years of continuous human use locked in stratigraphically sequenced buried soils, starting with the Late Dorset, followed by the Thule and the Inughuit, and topped by debris from Euroamerican historic exploration groups. It is clear that the draw to this area for all these groups, directly or indirectly, is a large little auk colony located further east in Foulke Fjord. Unfortunately, active erosion is now undercutting these deposits and they are falling into the fjord. Based on historic photos, this process began less than 100 years ago, with the most likely agent at play being decreased summer ice. Here we discuss results of NSF-funded mitigative excavations undertaken at lita in 2016 to recover as much information as possible about this unique site before its demise.

Darwent, Christyann M. (University of California, Davis) and Jeremy Foin (Bureau of Reclamation, Mid-Pacific Region)**[319]** *Gendered Differences in the Consumption and Discard of Food in Arctic Alaska*

Cape Espenberg, Alaska, provides a unique opportunity to directly compare two Thule-period (ca. AD 1400–1450) houses built at virtually the same time on the same beach ridge only one m apart. The tunnels of these houses are identically built; however, their interior construction, use of space, and artifact types and manufacturing debris strongly suggest that one house was a traditional domestic structure and the other was a men's house. Ringed seal, the dietary staple across the Arctic, dominates the domestic house (90%), but not the men's house (50%). Rather the men's house is comprised of 30% fish remains (primarily small, saffron cod), which make up less than 1% of the fauna recovered from the domestic house. In addition, there is a distinct pattern of discard in the men's house, with all fish recovered from the tunnel. In Arctic cultures, women are responsible for the distribution of food, even in a men's house. However, our understanding of this men's sphere is poorly known outside the ethnographic record. This analysis provides the first detailed study of a men's house using zooarchaeology as a proxy for gendered use of space.

Darwent, Christyann M. [144] see Darwent, John

Davidson, Iain (IDHA Partners, Australia)**[210]** *Scenes and Non-Scenes in Rock Art: Are There Things We Can Learn about Cognitive Evolution from the Differences*

Analysis of rock art in several regions shows great variability in the presence or absence of combinations of individual images that can be considered as scenes in our graphic traditions. This presentation will consider examples from Australia, Europe, and North America to show that the differences in the way people represented the world are significant about how they related to the world.

[210] Chair

Davidson, Matthew (University of Kentucky)

[264] *Terminal Prehistoric and Protohistoric Hide Processing in the Central Ohio Valley: Synthesizing Microwear and Metric Data to Evaluate Endscraper Function and Use Intensity*

As "beachheads of empire," sixteenth- to seventeenth-century European colonies in eastern North America vigorously pursued trade relations with Natives to secure raw materials for export to an emerging global market. Exchanges of furs and hides, slaves, and other commodities stimulated economic activity throughout eastern North America. Production of hides for exchange was widespread among native groups located on colonial peripheries. To contrast, relatively little research has evaluated the degree to which production for exchange penetrated the continental interior. This paper combines endscraper microwear and metric data from the Fort Ancient Hardin Site in the central Ohio Valley. These data confirm that uniface endscrapers—widely employed in the protohistoric southeast—were used primarily for hide processing, while biface endscrapers—uncommon in the protohistoric southeast—were used to work harder materials. Comparison of Terminal Prehistoric (AD 1400–1500) and Protohistoric (AD 1535–1635) tool assemblages does not strongly support the hypothesis that hide processing intensified over time. Several possible scenarios are proposed to examine this finding. This study also provides useful baseline information about endscraper function and use intensity that can be used to evaluate and compare hide processing at other sites in the Ohio Valley and beyond.

Davies, Benjamin (University of Auckland)

[38] *Using the Archaeological Record to Better Understand Models: An Australian Case Study*

In Australia's desert regions, different conceptual models are sometimes used to explain patterning in late Holocene surface deposits. Among these patterns are distributions of radiocarbon determinations, which have been concurrently explained as generated by intermittent occupation by hypermobile foragers, or growing semi-resident populations of broad-spectrum hunter-gatherers. This paper shows how models connected to the language and logic of record formation can help resolve competing archaeological interpretations. We constructed an agent-based model to explore how cultural and sedimentary deposition and erosion can combine to form patterns in a record of heat-retainer hearths visible on the surface. Initial results suggest that explanations invoking population dynamics or geomorphic processes have the capacity to produce qualitatively similar outcomes. A second chronometric proxy, optically-stimulated luminescence dates on hearth stones, was then used to assess expectations derived from the model based on how the process forms the pattern. These show patterning consistent with geomorphic model expectations to the exclusion of models invoking population dynamics. These findings have implications for interpreting Australian prehistory, contrasting with regional narratives of intensification, while also demonstrating how the formational approach applied here allows the archaeological record to inform back on model mechanics, presenting opportunities for models to be reassessed and reused.

[112] Discussant

[38] Chair

Davies, Benjamin [38] see Ladefoged, Theng

Davies, Gavin (University of Kentucky)

[218] *Controlling the Flow: Interregional Interaction, Community Prosperity, and Politics at the Highland/Pacific Frontier of Lake Atitlan, Guatemala*

Lake Atitlan sits within the Sierra Madre mountain chain which represents the physical divide between the Guatemalan highlands and the Pacific lowlands. It was thus ideally situated to act as a hub for cultural and economic exchanges between these two contrasting ecological zones. The three imposing volcanoes that line its southern shore, however, severely limited options for travel between these areas and commerce and settlement thus concentrated around obvious natural corridors such as those near San Lucas Toliman and Santiago Atitlan. Archaeological and ethnohistorical evidence nevertheless indicates that communities in the western half of the basin made use of several alternative routes to the coast, some of which continued to appear on maps into the twentieth century. These lesser-known routes enabled the Preclassic and Classic communities of this area to establish independent ties to centers like Chocoma and Palo Gordo, and to act as middlemen for exchanges originating to the north and east. During the Middle Classic (c. 400–600 AD), however, many of the centers connected to this network were abandoned and the elites of Chukmuk began to be buried with Teotihuacan-style vessels, signaling dramatic changes in the political and economic organization of the lake.

[218] Chair

Davis, Caitlin (Independent Researcher)

[7] *Flower and Song: Exploring Literacy in Postclassic Mesoamerica*

The Postclassic codices of the Maya, Mixtec, and Nahuatl peoples have often been separated based on preconceived notions of literacy and language, with the Maya codices receiving an epigraphic approach while the Nahuatl and Mixtec receive an art historical approach. This division is largely arbitrary and based on Western assumptions of the nature of writing and its form, privileging scripts which lean toward the alphabetic as more advanced. Within these codices, the linguistic practice of difrasismo serves as a fundamental organizing principle. Difrasismo is a form of metaphorical speech which manipulates opposing elements in order to convey more abstract concepts. The codices feature extensive use of similar difrasismo represented in overlapping pictorial and phonetic means, demonstrating a continuity in the underlying principles governing metaphorical language and writing itself. This study challenges the division between pictorial and phonetic scripts which underscores much epigraphic research, and promotes a more holistic and cross-cultural view of Mesoamerican literacy.

Davis, Dylan (Binghamton University) and Carl Lipo (Binghamton University)

[302] *The Benefits of Short-Wave Infrared Imagery for Archaeological Landscape Analysis: A Case Study from Easter Island, Chile*

The use of multispectral imagery is particularly effective for studying the archaeological record of Rapa Nui (Easter Island, Chile) due to the lack of vegetation and the fact that record is composed of surface distributions of rock features. Flaws (2010) has demonstrated that WorldView-2 multispectral imagery that includes the NIR band can be used to identify "lithic mulch gardens," a key component of prehistoric Rapa Nui subsistence strategies. Recently, the availability of WorldView-3 satellite imagery data offers researchers access to short-wave infrared (SWIR) bands, which provide significant additional information about moisture content and mineral composition. Unfortunately, this imagery is currently only available at a much lower spatial resolution than NIR images. Here, we evaluate whether or not this new source of SWIR imagery can be used for measuring "lithic mulch garden" features despite its significant resolution difference. Comparing the results of Flaws (2010) analysis of with the results obtained using maximum likelihood classification analysis of SWIR WorldView-3 imagery we found markedly similar classification accuracy, despite having a significantly lower

spatial resolution. This result suggest that SWIR may provide a new tool for researchers interested in questions of prehistoric land use that will become increasingly powerful as greater spatial resolutions become available.

Davis, Jeffrey (Northern Arizona University), Julie Hoggarth (Baylor University) and Jaime Awe (Northern Arizona University)

[321] *Artifactual Composition of Terminal Deposits from the Classic Maya site of Baking Pot, Belize*

Throughout the Maya Lowlands, archaeologists have identified Terminal Classic deposits associated with the final activities in ceremonial spaces. These features include concentrations of cultural material deposited in the corners of plazas and courtyards. At the site of Baking Pot, Belize, the Belize Valley Archaeological Reconnaissance (BVAR) project has identified several of these terminal deposits. This presentation will shed light on the types of artifacts being deposited during these final events to answer questions related to the nature of abandonment activities. From this information, we aim to identify the cultural significance of ritual deposition of cultural materials, how distinct combinations of artifact classes can yield information on human behavior, and how the terminal deposits at Baking Pot offer additional information to learn about abandonment activity in the Maya Lowlands. We will present the preliminary artifact inventories associated with terminal deposits in the form of a proportional distributions of artifacts found in each deposit at the site of Baking Pot, Belize. These methods allow for direct comparisons between deposits at Baking Pot, with those at sites in the Belize River Valley, and with others in the Maya Lowlands.

Davis, Kaitlyn E. (University of Colorado, Boulder) and Scott G. Ortman (University of Colorado, Boulder)

[277] *Artifact-Based Measures for Scaling Research in the Rio Grande Pueblos*

Initial applications of settlement scaling theory focused on measures derived from the built environment, such as house density and settled area. Although this is appropriate, the theory actually focuses on the role of social networks in socioeconomic rates, and thus connects to a variety of artifact-based measures of such rates. In this paper, we develop these connections using data from the Rio Grande Pueblos of New Mexico. We first compare pueblo room areas to show that socioeconomic outputs increased with settlement population. Then, we examine ratios of decorated pottery to cooking pottery to show that consumption rates of decorated vessels increased in the same manner. Finally, we use the ratio of chipped stone debris to cooking pottery to measure investment in production of stone tools, finding an increased efficiency in their production and use. We argue that this pattern derives from an expansion in the division of labor that accompanies group size. By extending the scaling framework to artifact-based measures like these, our results show that there is a connection between social networks and artifact accumulation rates in ancient societies. This suggests the scaling framework is useful for understanding a wide array of measures obtainable from the archaeological record.

Davis, Lauren (Ben-Gurion University), Omry Barzilai (Israel Antiques Authority) and Ofer Marder (Ben-Gurion University of the Negev)

[338] *The Aurignacian Lithic Industry from Area E*

Area E of Manot Cave, Western Galilee, is found at the top of the western talus, close to the apparent natural opening of the cave, which was blocked approximately 30 kya. The area appears to be the natural end of the living surfaces, with the main living area possibly being closer to the natural entrance. Area E is composed of two sedimentological Units; Unit 1, which is composed of topsoil and Unit 2, which contains the archaeological layers. Unit 2 in area E is divided into nine archaeological layers, I–IX, with possible additional subdivisions. These layers represent living surfaces. The living surfaces usually appear together with breccia, within which we find a large amount of faunal remains, flint, bone tools, decorated items and hearths. Layers I–III, appear to be composed of a post-Aurignacian tradition with small twisted bladelets, dofour bladelets, end scrapers and burins with very few faunal remains. The excavated Layers IV–IX are comparatively richer in faunal material and are characterized by Aurignacian tools flint tools including blades, carinated and nosed scrapers, flat scrapers, carinated burins and some dofour bladelets.

Davis, Loren (Oregon State University)

[226] *Searching for the First Americans along Oregon's Ancient Coast: New Methods and Upcoming Research*

To date, efforts to search for and investigate Pleistocene-aged sites along the Northwest Coast have been largely limited to subaerial landforms and deposits. Beginning in 2017, the search for early coastal sites will extend onto Oregon's outer continental shelf. These search efforts will be supported by the use of a GIS-based model that makes predictions about the foraging potential of reconstructed late Pleistocene-aged coastal landscapes. We review the modeling methodology and how reconstructed physical and human ecological aspects of Oregon's coastal landscape may have changed from the LGM to 12,000 cal BP. We also discuss upcoming fieldwork activities and goals for the search, identification, and recovery of archaeological evidence from Oregon's ancient submerged terrestrial landscapes.

[110] *Discussant*

Davis, Marni [18] see Glover, Jeffrey B.

Davis, Mary A. (UW-Madison)

[269] *Moderator*

[269] *Discussant*

Davis, R. P. Stephen, Jr. (University of North Carolina)

[336] *Documenting Archaeological Contexts with 3D Photography*

Photography has long been one of the best tools archaeologists have for creating a visual record of excavations and contexts in the field. In recent years a variety of new techniques, from laser scanning to photogrammetry, have been developed and employed throughout the world that now allow archaeologists to create a three-dimensional photographic record. This paper explores one such technique—structure from motion—that has been used for mapping and to document excavated contexts at the late precontact Wall site in North Carolina. Structure from motion permits the construction of highly detailed, georeferenced, photo-realistic models using affordable software and field photographs taken with an ordinary digital camera common to all archaeological projects. Such models are much more than simply three-dimensional representations of the real world; they contain dense geospatial data that can be easily extracted and used in a variety of analytically useful ways.

Dawei, Tao (Department of Archaeology, Zhengzhou University)

[117] *Starch Grain Analysis of Human Dental Calculus from Guanzhuang Site, Henan Province*

This research aims to investigate the human foodstuffs and lifestyle during the Western and Eastern Zhou Dynasties in the core area of the Central Plains using starch grain analysis of human dental calculus. Plant microfossils, starch grains and phytoliths, which were found in most of calculus samples from Guanzhuang site, were from millets, bread wheat, rice, adzuki, tubers, and acorns. Diversity of starch grains and phytoliths in morphological characteristics extracted from dental calculus indicates that a variety of starchy plants, including crops and gathered plants were

consumed by the Guanzhuang inhabitants. Millets were dominant in the human diet of the Guanzhuang site; and bread wheat was of secondary importance. Combined with the macrobotanical evidences from Guanzhuang and other neighboring sites, the traditional millet agricultural system still existed in the core area of the Central Plains while the multiple cropping system had emerged in this region. In the meantime, the importance of bread wheat increased in the agricultural system and the change in the cropping system from millet-dominant to bread wheat-dominant come up during the Western and Eastern Zhou Dynasties.

Dawson, Emily (University of Texas at Austin), Alexandria Mitchem (University of Pennsylvania), Fabian Toro (University of Pennsylvania) and Chantel White (University of Pennsylvania)

[261] *Daily Life in a Classical Port City: Archaeobotanical Evidence from Northern Greece*

Recent excavations at Molyvoti, a large fourth-century BC settlement on the northern Aegean coast, have uncovered a residential neighborhood of homes and roadways laid out on a Hippodamian grid system. Thousands of carbonized plant remains have been identified from excavated domestic contexts including house floors, hearths, and abandoned wells. Macrobotanical results indicate that residents' diets relied heavily on cereals such as barley and free-threshing wheat. Cereal processing activities at the site are evidenced by specimens of ground grain and bread fragments from a stone-and-plaster hearth feature. Along with grapes, hazelnut, and fig, the well-preserved contents of an abandoned well contained hundreds of charred conglomerations identified as probable food residues. The macrobotanical record at the site is complicated by the presence of sheep dung associated with courtyard floors, raising important questions about potential fuel sources and the multiple uses of courtyard-kitchen spaces. These results contribute to a growing picture of local and regional economies in Classical northern Greece through the lens of residents' food choices and routine food preparation activities.

Dawson, Tom, Elinor Graham (SCAPE) and Joanna Hambly (University of St Andrews)

[224] *Community Action at Sites Threatened by Natural Processes*

Around the world, thousands of archaeological sites are threatened by coastal processes. Although many countries have successfully implemented schemes to address threats from development, this is not the case for sites at risk from natural processes. Without developers to fund mitigation projects, the scale of the problem appears enormous, and it is difficult for individual agencies to commit to preserving, or even recording, everything at risk. Systems are needed to update information and prioritize action to channel resources toward the most vulnerable areas. In Scotland, a program of national coastal survey was followed by a desk-based prioritization project. However, the dynamic nature of the coast means that networks are needed to monitor change and report new discoveries. A citizen-science approach was adopted that recognized the wealth of knowledge and interest in heritage within local communities. The Scotland's Coastal Heritage at Risk Project (SHARP) works with a volunteer network to update records of prioritized sites. The information contributed by citizen archaeologists allows reevaluation of priority sites and provides a more accurate picture of the scale of the threat to heritage. This paper examines SHARP and lessons learned through running a project that channels community archaeology into solving a national problem.

Dawson, Tom [224] see Rivera-Collazo, Isabel

Day, Peter (University of Sheffield)

[132] *Refugees, Tradition, and the State: Malleable Materials and Plastic Practices in Ceramic Production on Lesbos, Greece*

Lesvos (Mytilini) in the Eastern Aegean has been prominent on our TV screens during the human migration toward Europe. The last major population movement in the area, around 100 years ago, comprised the Greek-speaking Christian Orthodox, including several potters, forced out of Asia Minor. Some of these craftspeople came from Canakkale, in present day Turkey, working in the tradition of sometimes bizarre glazed wares. They settled on an island with a large number of active workshops producing utilitarian pottery, notably water jars, but including cooking vessels. Several generations later, the present study of individual potters, their products, practices and motivations builds on rich ethnographic study on the island by a variety of scholars. It examines different narratives, involving individual potters in relation to the modern Greek state, placing value on "tradition" and "authenticity." The idea promoted by heritage organizations of "tradition" as static and something to be preserved contrasts with the economic reality of life as a potter. The tensions highlighted by terminologies of inclusion or exclusion, whether that be potters versus ceramicists, craft versus art, reveal a fluidity of materials, practice and identity in which the 'foreign' becomes incorporated and, in some cases, becomes the paradigm of tradition.

De Alba, Jennifer [231] see Buehlman-Barbeau, Savanna

De Anda Rogel, Michelle Marlene (Proyecto Templo Mayor) and Fernando Carrizosa Montfort (Proyecto Templo Mayor)

[225] *Representations of Fauna in Mural Paintings of Tenochtitlan*

The accelerated process of deterioration of the murals from the religious buildings of Tenochtitlan has threatened their long-term conservation. This has impeded different activities including the creation of the project for the graphic documentation of the polychromy in the Mexica capital. It was specifically developed to recover and store, as an accurate witness, all the motives of the paintings, as well as its architectural context. Over the course of 20 years, the development of this methodology has combined different registering process, including direct copies over the decorated facades, the chromatic restitution of each mural, the use of topographic surveying, high-definition photography, and vectorial models of the six buildings that still have paintings. One of the greatest discoveries that this methodology produced was the identification of some traces almost unseen by naked eye due to the poor state of conservation. This paper presents the two neo-Teotihuacán buildings known as "Red Temples" (Templo Rojo Norte and Templo Rojo Sur) where we identified some faunistic motives. Simultaneously, the analysis between the Teotihuacán paintings style in relation with the one from the mexicas.

de Barros, Philip (Palomar College)

[161] *Using Ethnoarchaeology to Interpret Archaeological Blacksmithing Sites in Togo, West Africa*

A 2013 study of the ethnoarchaeology of the blacksmithing village of Upper Bidjomambe in the ironworking region of Bassar in northern Togo provided invaluable data to help archaeologists interpret archaeological smithing sites. Oral traditions document the village's occupation from ca. 1870 to 1970 when it was abandoned leaving it virtually intact with little disturbance or tool recycling. An 80-plus-year-old informant formerly from Upper Bidjomambe, who was a stone hammerman for a traditional three-man smithing team, provided invaluable ethnoarchaeological data linked to a GPS-based site map that documents partially standing house ruins; forging locations based on in situ anvils and stone hammers; stone outcrops used to process iron blooms (likumanjool); and slag trash deposits near residences or in larger smithing dumps. These data points and their spatial interrelationships were used to interpret two eighteenth–nineteenth century archaeological smithing sites associated with the present-day, former smithing villages of Bitchabe and Bidjobebe. These archaeological sites have been impacted by hoe agriculture, tool recycling, and school and/or road construction. The partial reconstruction and interpretation of these sites using the Bidjomambe data is evaluated as to its degree of success.

de Carteret, Alyce (Brown University) and Sarah Newman (James Madison University)**[125]** *Sharing Wares and Waging Wars: The Politics of Ceramic Exchange at the Classic Maya Site of El Zotz, Guatemala*

The Classic Maya city of El Zotz, relatively small compared to its neighbors, is situated geographically, and at times politically, between El Perú-Waka' to the west and Tikal to the east. The archaeological site occupies an elevated position within the Buenavista Valley, a southwest to northeast corridor running for some 32 km to the north of the Lake Petén Itza region. The valley connects the northeast and northwest Petén, from Chetumal Bay to the Bay of Campeche, placing the site in a strategic position along major trade routes in the region. Research by the El Zotz Archaeological Project (2006—present) demonstrates that the city's fortunes and misfortunes were heavily influenced by political developments (both collaborative and antagonistic) in the surrounding region. Yet, even as the geopolitical landscape became increasingly fractured during the course of the Classic period, ceramic evidence suggests that El Zotz maintained connections with its neighbors in the Western Petén. This paper will evaluate the ceramics of El Zotz from a regional perspective, bringing to light the politics of ceramic exchange for this Classic Maya city.

De Jesús Pérez, Pablo Fernando**[137]** *Un complejo arqueológico en las márgenes del río Tehuantepec en la Sierra Sur de Oaxaca: El caso de Ladchixila*

El presente estudio trata sobre trabajos realizados en la Sierra Sur de Oaxaca, localizado en los márgenes del río Tehuantepec, región en donde se establecieron grupos humanos dedicados a la caza, pesca, recolección de frutos y agricultura, con recursos naturales que fueron explotados, haciendo posible su establecimiento permanente, dejando plasmada su historia a través de elementos arquitectónicos, que para el año de 2015 fueron explorados arqueológicamente. El desarrollo de esta investigación se enfoca de manera específica sobre la Zona Arqueológica en el paraje el "Llano," correspondiente a la jurisdicción de Ladchixila y donde se tratarán temas sobre la distribución espacial de los edificios, la función de elementos arqueológicos y arquitectónicos que se localizaron alrededor de la acrópolis, así como terrazas localizadas en laderas y conjuntos habitacionales que fueron excavados, detectándose contextos funerarios con ofrendas asociadas. Las labores de exploración durante varios meses de trabajo en esta Zona Arqueológica, arrojaron información importante sobre los estilos arquitectónicos identificados, así como la temporalidad relativa (a través de la cerámica y lítica), y posible filiación cultural con los Valles Centrales de Oaxaca.

De La Torre Salas, Natalie and Isabel Rivera-Collazo (University of California San Diego)**[370]** *Switching Perspectives: Ethnographic Analysis of Community Viewpoints Regarding In Situ Preservation of Archaeological Sites*

The varied definitions of cultural heritage imply that archaeological sites and their landscapes are important for the shaping of local cultural identities. Nonetheless, many of these definitions are unclear about the relationship that communities can have with archaeological sites. Using place attachment theory and a knowledge-centered approach, I explore the cultural and historical knowledge that people have regarding their cultural heritage, their general perception of archaeology, their attachment to archaeological sites, and their opinion regarding "in situ" preservation of heritage. The community of Los Indios in Santa Isabel, Puerto Rico, presents an ideal case study to evaluate these issues given that it has a very long history of occupation and is located on top of a large archaeological site. In this presentation I show how, through the use of ethnographic data, it is possible to evaluate and understand the motivations and interests of residents regarding the definitions, and preservation of cultural heritage. Knowing which elements limit or facilitate participation of residents toward the preservation of archaeological sites is an undervalued variable that affects local knowledge shaping local identities, cultural knowledge, and understanding of what it is cultural heritage; and should be incorporated into long-term site management plans and regulations.

De Lucia, Kristin (Colgate University)**[267]** *Style, Memory, and the Production of History: Aztec Black-on-Orange Pottery in Xaltocan, Mexico*

This paper will explore shifting patterns in ceramic consumption and stylistic design during the Postclassic period (AD 900–1350) at the site of Xaltocan in the Basin of Mexico. Xaltocan is the only site in the northern Basin of Mexico associated with a large percentage of early Black-on-Orange pottery. This same pottery is rare at contemporaneous sites located a few kilometers away. Because Black-on-Orange ceramics were used by elites and commoners alike, and also cross-cut various ethnic and linguistic groups, there would have been multiple potentialities and entanglements associated with stylistic shifts in pottery. I argue that rather than self-driven or inevitable processes, shifts in the style and consumption of Black on Orange pottery represented explicit ideological statements about the creation of difference and identity. Similarly, I argue that periods of stasis in stylistic design, as well as boundaries in pottery use, were actively maintained rather than a consequence of non-interaction. Although this paper focuses primarily on stylistic traditions within the Basin of Mexico, it may help us to understand styles more broadly as active processes linked to ritual and identity, while also involved in the construction of power and the production of history.

[267] *Chair*

De Pol Holz, Ricardo [143] see Santoro, Calogero M.

de Rioja, Víctor L. [38] see Fort, Joaquim

De Smedt, Philippe (Ghent University)**[336]** *Ephemeral Features and Evolving Landscapes: Understanding Mankind's (in-)Visibility in the Archaeo-Geophysical Record.*

Geophysical prospection methods are coming of age as a standard part of the archaeological tool kit. Archaeologists, especially in Europe, are increasingly reliant on geophysical data in both developer-led and research archaeology. More recently, archaeological geophysics is bridging the gap between site and landscape through motorized survey strategies. This upscaling particularly highlights a number of methodological difficulties inherent to geophysical prospecting. A first follows its noninvasive character as, by approaching the subsurface from top to bottom, any geophysical result reflects a palimpsest stacking the most recent to the most ancient land-use traces within one dataset. Secondly, while the range of geophysical methods is diverse, each method's potential correlates strongly to the targeted geological context. Lastly, the ephemeral nature of specific types of archaeology warrants caution in implementing these methods. Settlement traces of hunter-gatherer societies, for instance, often remain invisible to geophysical prospecting and, in general, prehistoric archaeology is the most evasive in geophysical datasets. Here, archaeological 'invisibility' in geophysical datasets will be addressed, while discussing the influence of recent land use and geology on the interpretive potential of such data. Additionally, a basic framework relevant to archaeologists working with geophysical prospection data will be set out, illustrated through different case studies.

De Smedt, Philippe [87] see Delefortrie, Samuël

de Smet, Timothy

[87] *Integration of Multiple Geophysical Datasets to Classify Archaeological Responses*

North American archaeologists are increasing using multiple near-surface geophysical techniques at archaeological sites to locate features of interest. Examining different physical properties in the subsurface has greatly improved archaeological interpretations; however, these data are often examined in a subjective site specific fashion (notable exceptions are the pioneering work of Kvamme and Ernenwein). This research seeks to quantitatively integrate magnetic gradiometry, frequency-domain electromagnetic-induction (magnetic susceptibility and apparent conductivity), and ground-penetrating radar data from the Magnolia Valley site, Rutherford County, Tennessee. Moreover, this research examines the effects of novel processing techniques (including reduction-to-the-pole, attribute analysis, and Hilbert transform) on the correlation structure of the data in order to improve subsequent classification via supervised and unsupervised learning. A short term goal of these data, or information, fusion techniques is the ability to statistically predict archaeological geophysical responses based upon geophysics and limited archaeological testing. The long-term goal of this research program is the stewardship and preservation of the archaeological record, where archaeogeophysics can be used as a standalone method to answer fundamental anthropological research questions about human behavior, social organization, and cultural change through time—without costly and destructive excavation.

De Tomassi, Mirko**[369] *El Culto de los Antepasados en Conjuntos Domésticos en el Valle de Copán, Honduras y las Implicaciones Sociales que influyen en las Prácticas Funerarias***

La presente ponencia trata de analizar las prácticas funerarias que se llevaban a cabo en distintos conjuntos domésticos excavados en el territorio dominado por la ciudad de Copán durante el Clásico Tardío. En la sociedad maya, las relaciones consanguíneas con los antepasados cobraban mucha importancia para el mantenimiento del poder. Las unidades sociales que se fundan en los lazos de parentesco implican desigualdad en la participación en el poder, definida con base en la proximidad al ancestro común. Las evidencias arqueológicas procedentes de casas de distintas partes del área maya demuestran la existencia de este culto en ámbito doméstico y que este jugaba un papel importante en la construcción y el mantenimiento de la unidad doméstica. Por ejemplo, en los distintos patios que formaban el conjunto doméstico 9N-8, en Copán, convivía gente de distintos niveles sociales, etnias, sexo y edades. Las distintas maneras en que se llevaban a cabo las prácticas funerarias estaban influenciadas por la heterogeneidad que caracterizaba el conjunto doméstico. La pregunta que esta investigación pretende contribuir a contestar es cómo funcionaba este mecanismo en un conjunto doméstico heterogéneo, en donde convivían distintas familias que con mucha probabilidad no compartían un antepasado común.

de Voogt, Alex [219] see Dupras, Tosha

Deal, Michael (Memorial University of Newfoundland), John Campbell (Memorial University of Newfoundland) and Bryn Tapper (Memorial University of Newfoundland)**[52] *A New Approach to Precontact Archaeological Research on the Annapolis River System, Nova Scotia, Canada***

Boswell (BfDf-08) is the first archaeological site to be excavated along the Annapolis River, in north-central Nova Scotia. Previously, less than 50 sites had been recorded in the 2,130 km² watershed, and only a few of these were tested. Therefore, Boswell is the baseline for our understanding of precontact occupation for this entire drainage system. Thus far, the site has revealed a cultural sequence beginning with the Transitional Archaic (ca. 4100–2700 BP), followed by Middle and Late Woodland (ca. 2500–1500 BP) occupations. Work at the site since 2011 has included paleoethnobotanical and zooarchaeological analyses and a paleoenvironmental reconstruction. Subsistence activities at the site included fishing, hunting of beaver and birds, and the collection of edible berries and nuts. The deeply stratified sediments at the site give an indication as to why so few sites and private collections have been recorded. Based on the Bowell excavations, the authors recommend a new approach for future archaeological work in this understudied part of the province.

[52] *Chair*

Dean, S. D. [160] see Franklin, Jay

deBeaubien, Domonique [365] see Mahoney, Maureen

DeBlasis, Paulo [45] see Corteletti, Rafael

DeBoer, Warren (Queens College CUNY)**[270] *Discussant***

Debono Spiteri, Cynthianne [173] see Rageot, Maxime

DeCorse, Christopher (Syracuse University)**[128] *Discussant***

Déderix, Sylviane [130] see Dungan, Katherine

Dedrick, Maia (University of North Carolina at Chapel Hill), Adolfo I. Batun-Alpuche (Universidad de Oriente) and Patricia McNany (University of North Carolina at Chapel Hill)**[36] *Imperfect Beeswax Production in the Land of Honey—Yucatán, Mexico***

Spanish encomenderos and friars demanded beeswax from their subjects in Yucatán, Mexico, during the early Colonial period. This wax was harvested from beehives infrequently used for wax production in prehispanic times—instead the focus throughout the long history of beekeeping in the region was on honey. In fact, indigenous honeybees, from the genus *Melipona*, make an impure wax in low quantities, which would have made candle production difficult. These candles were important for Catholic ceremonies and the process of conversion. This paper considered evidence of beehive production from a Colonial house situated within one small community in Yucatán, Mexico, and connect the local histories of honey and wax production to the complicated trajectory of Spanish conquest in the region. It is considered that the nature of local wax ecology and production as well as the quantities of

wax demanded from communities based on historical tax records, comparing this information to tribute records from other regions in which people experienced early Spanish colonialism.

[291] *Discussant*

Dedrick, Maia [280] see Batun-Alpuche, Adolfo I.

deFrance, Susan (University of Florida)

[238] *The Political Ecology of Camelid Pastoralism by Wari and Tiwanaku Colonists in the Moquegua Valley, Peru*

The Moquegua Valley in southern Peru was the locale where the rival early imperial states of Wari and Tiwanaku established provincial colonial centers. Both Wari and Tiwanaku colonists concentrated their settlements in the low to mid-sierra elevations of the valley, elevations that are not modern zones of camelid husbandry. The political ecology of imperial settlement at this elevation fostered the development of local systems of camelid pastoralism that were significant economic components for both groups of colonists. Camelids were used for dietary and ritual uses as well as for transport and trade. The osteological, morphological, pathological, and isotopic evidence from camelid remains from a range of sites associated with both Wari and Tiwanaku settlements indicate that local production and breeding of camelids were significant components of the livelihoods of colonists regardless of cultural affiliation. This ability to rear camelids in this setting and to create economic ties with communities at higher elevations attests to the significant political ability of these early empires to alter their local settings in order to sustain these animals and to create viable economic and cultural systems.

[331] *Discussant*

deFrance, Susan [284] see LeFebvre, Michelle

Dega, Michael (Scientific Consultant Services, Inc.) and David Perzinski (Scientific Consultant Services, Inc.)

[123] *Garapan and San Roque: Case Studies from Saipan, CNMI*

This paper takes site data from two recently excavated locales on Saipan and discusses the archaeology, physical anthropology, and bioarchaeology of the sites. The goal is to frame these within larger questions of origins, changes in the island's demography through time, and to assess several migration models for settlement of Saipan and the Northern Marianas.

Dega, Michael [123] see Dudgeon, John

Dega, Michael [123] see Franklin, Olivia

DeGiorgio, Michael [176] see Malhi, Ripan

Deibel, Corinne (Earlham College), Michael Deibel (Earlham College), Jiqiao Shi (Carnegie Mellon University), Johnathon Hornak (Earlham College) and Hannah Munro (Earlham College)

[99] *Characterization of Neolithic Jade Objects from Shimao and Xinhua, Shaanxi Province, China, Using Handheld Portable Techniques*

Fifty jade objects from the Late Longshan period, excavated from the Shimao (25) and Xinhua (25) Neolithic sites, were characterized mineral groups using handheld X-ray fluorescence (hhXRF) and handheld specular reflectance Fourier transform infrared spectroscopy (hhFTIR). The objects were found to belong to three types of minerals. Twenty-two objects found in Shimao (88%) are nephrite (19 tremolites and 3 actinolites), two are calcite and one antigorite. From Xinhua, 9 objects (36%) are nephrite (tremolites), 14 are antigorites, one is calcite, and one chlorite. The higher percentage of nephrite jades found in Shimao confirms its high status and affluence. The minerals were classified into subgroups using HHXRF. All Shimao nephrites, and all but one from Xinhua, are D-type nephrites. Only one Xinhua nephrite is an S-type nephrite. Based on R^* values, the D-type nephrites were divided into four groups. The largest group (R^* : 0.980 to 0.995) includes 8 nephrites from Xinhua and 14 nephrites from Shimao, indicating possible common geological origins. The Xinhua antigorites were classified into three groupings based on Ni, Cr and Al content. These results can be used to build a database of jade objects from the Late Longshan culture to help establish the origin of undocumented jades.

Deibel, Michael (Earlham College), Corinne Deibel (Earlham College), Ye Wa (UCLA) and Liping Yang (Shaanxi Provincial Institute of Archaeology)

[279] *Analysis of Ancient Chinese Pottery Utilizing X-ray Fluorescence and Diffuse Reflectance Infrared Fourier Transform Spectroscopy*

Field studies were performed at the Yangganzhai Neolithic site near Xi'an, China, using an Olympus Delta Premium portable XRF spectrometer and an Agilent ExoScan FTIR spectrometer. 932 ceramic sherds collected from nine locations across the site were selected and classified based on color (red, tan and brown), decorations (painted, rope impression—cord or thread, and plain), and time period (Miaodigou and Banpo IV). Each sherd was broken, so that the analysis could be performed on a clean edge to minimize surface contamination. Although ceramics have much more complex matrices than most lithic samples, distinct patterns could be observed in several preliminary PCA (Principal Components Analysis) tests. In the main moat (G8-1), an apparent change in clay composition was observed from earlier layers to later layers. Three main clay composition groupings were found in many locations. Differences in clay compositions were also observed in sherds fired at different temperatures (FTIR-assigned firing temperature). One location (402) was clearly different in clay composition from all the others. Additionally, these data seem consistent with a more homogeneous clay composition in the Banpo IV period than in the earlier Miaodigou period.

Deibel, Michael [99] see Deibel, Corinne

Deiter, Karissa (Vanderbilt University), Sara L. Juengst (University of North Carolina at Charlotte), Manuel Mamani (National University of Saint Augustine) and Antonio Villaseñor-Marchal

[75] *Mortuary Analysis of Juvenile Burials in the Sacristy of a Spanish Colonial Reducción in the Southern Highlands of Peru*

Mortuary practices at Spanish colonial sites in Latin America varied in terms of burial location, style of burial, and associated grave goods. Understanding burial practices is one way to investigate shifting identities, conversion to Catholicism, and the degree of control over and involvement of priests in daily life at colonial sites. The mortuary practices at the reducción (planned colonial town) of Santa Cruz de Tuti (today known as Mawchu Llacta, Colca Valley, Peru) reveal nuanced insights into colonial life for the living through their treatment of the dead. Focusing on body orientation, associated grave items, and the demographic profile of this burial population, we present mortuary data from 21 child burials in the sacristy at Mawchu Llacta. The exclusively juvenile demographic profile of the burial population in the sacristy likely reflects its liminal status just outside the sacred space of the church nave, but in nearest proximity to it (and the main altar). We also make comparisons between the mortuary practices seen here, the mortuary

practices in nearby prehispanic mortuary complexes, and direct historical antecedents, such as at Malata, an early colonial Franciscan doctrinal settlement that was resettled to Mawchu Llacta.

Deiter, Karissa [75] see Juengst, Sara L.

Del Castillo Bernal, Florencia [286] see Barcelo, Juan

Delaere, Christophe (Université libre de Bruxelles)

[199] *Underwater Archaeology in Lake Titicaca, Bolivia: Use of the Littoral Zone in the Tiwanaku Period (AD 500–1150)*

Since 2014, the project of underwater archaeology in Lake Titicaca (ULB), gives priority to the study of the Yampupata strait between the Island of the Sun and the Copacabana Peninsula. This research strategy was chosen because of different elements: First of all, the Island is a homogenous insular territory whose affordable dimensions (14,3 km²) allow underwater activities. Secondly, one of the main characteristics of this territory is its dense, complex and continuous occupation which has been recorded by Archaeology. Human occupation of the Island of the Sun dates back especially to the (pre)Tiwanaku period (AD 300–1150), followed by the ideological reappropriation implemented by the Incas (AD 1430–1532). Finally, this insular area involves navigation and the use of the littoral zone (transit point; Westerdahl, 1992:6). The access area to the Island of the Sun was located and excavated in 2014 (Puncu). The departure area for the island, in the continent, was located and excavated in 2016 (Ok'e Supu). In total, for an excavation area of 120 m² (30 test pits), more than 6000 fragments of artifacts were recorded in their stratigraphic context. We propose to show a far-reaching dialogue between the scientific results from both port areas.

DeLance, Lisa (University of California, Riverside)

[357] *The Complexity of Trash: Reframing Construction Fill*

Mesoamerican archaeologists have traditionally, although not exclusively, viewed artifacts found in the context of construction fill as trash and devoid of primary contextual information, a view that has limited the questions that archaeologists are able to ask of these materials. This paper posits an alternative interpretation to the meaning of material culture used in construction fill, utilizing evidence from Formative period construction fill found at the site of Cahal Pech, Cayo, Belize. Specifically, this presentation illustrates the possibility of the deliberate and agentic placement of specific types of material culture into the context of construction fill as a deeply meaningful act of community building that places both kin groups and individuals at the center of construction episodes.

[357] *Chair*

Deflefortrie, Samuël (Ghent University), Philippe De Smedt (Ghent University), Mark Gillings (University of Leicester), Martin Green and Joshua Pollard (University of Southampton)

[87] *Mining and Interpreting Archaeo-Geophysical Data through Excavation: A Case from Prehistoric Knowlton (Dorset, UK).*

Identified by aerial photography, the presence of a presumed prehistoric long-barrow and ring ditch called for detailed investigation by targeted excavation. Located in Dorset (UK), the features are presumed part of a larger ritual environment of which the 'Knowlton Circles,' a complex of Neolithic and Bronze Age monuments, are best known. To aid in planning excavations and add to subsequent interpretation, detailed geophysical prospection, in the form of multi-receiver electromagnetic induction survey, preceded invasive fieldwork. Alongside fine-tuning the excavation layout, the geophysical data were calibrated through recording physical soil properties of the excavated surfaces, and validated archaeologically by comparison to the excavation results. Alongside evaluating of the survey methodology, the geophysical and excavation data were combined into an iterative interpretation procedure. This entailed joining both datasets on a physical and archaeological level to create a reference point which would not only allow improving future surveys, but enable better understanding of the 3D morphology of detected features, their level of preservation and geological context prior to excavation. While exemplified through a single case study, this presentation aims to show how considering geophysical prospection an inherent part of the excavation process, can help construct a more robust framework for subsequent archaeological interpretation.

Delgado, Florencio [270] see Astudillo, Fernando J.

Delgado Espinoza, Florencio [384] see Stahl, Peter W.

Delgado Ku, Miguel [9] see Vermillion, Rebekah

Dello-Russo, Robert, Banks Leonard (UNM Office of Contract Archeology) and Robin Cordero (UNM Office of Contract Archeology)

[332] *Analytical Challenges Posed by the Early Holocene/Late Paleoindian Activity Areas at the Water Canyon Site, West-Central New Mexico: How Do We Know What We Think We Know?*

Accuracy in the identification of Late Pleistocene-Early Holocene open activity areas and the subsequent inference of human behavior requires that non-behavioral causes for differential spatial patterning be considered before approaching the question of how patterning reflects human activities. Such challenges in the interpretation of behavioral patterning are exemplified at the Water Canyon Paleoindian site. In this paper, we initially describe the lithic and bone assemblages recovered from the Late Paleoindian component (ca. 9600 cal BP) at Locus 1, a suspected Bison antiquus processing area. We then map out any apparent spatial patterns in the assemblages and examine how postdepositional geomorphic and taphonomic processes may have biased these patterns and the chronology of the deposits. Once potential biases are identified, we then move on to more securely infer various activities. Thus, not only is the recognition of these biases critical to the subsequent functional interpretations at Locus 1, it is instrumental in helping us design future investigations there and at other activity areas across the site.

Delpiano, Davide [169] see Peresani, Marco

Delsol, Nicolas (University of Florida)

[292] *The Columbian Exchange in Mesoamerica: Early Colonial Documents and Zooarchaeology in Guatemala*

At the end of the fifteenth and the beginning of the sixteenth century, the massive introduction of new animal species in the Americas put an unprecedented stress on both the environment and Native American societies. Although archaeological animal remains are often used to inform discussions on American-European transculturation in other areas, few such studies have been done in southern Mesoamerica. This talk will use historical sources and published zooarchaeological data to provide a first overview of the human-animal relationship during the first century of Spanish

colonization in the Maya world. Primary data will be drawn from historical accounts from the former capital of the Audiencia, Santiago de Guatemala, and comparative zooarchaeological data from the period across Mesoamerica. During the early colonization, the trade of cattle hides and other animal products that can be traced archaeologically, was a significant source of riches for the European colonists. Santiago was also an important regional center and meeting place for the exchange of ideas between many ethnic groups including Spaniards, Mexican auxiliaries, Mayans and eventually, African slaves. The aim of this talk is to emphasize the relevance of further zooarchaeological research for informing us about this period of rapid cultural and environmental change.

Demarest, Arthur (Vanderbilt University), Carlos Alvarado (Universidad del Valle de Guatemala) and Tomás Barrientos (Universidad del Valle de Guatemala)

[182] *Investigations at San Andres Semetabaj and the Problematics of Middle to Late Preclassic Highland Archaeology*

The site of San Andres Semetabaj, Guatemala, located on the northern edge of Lake Atitlan, is central, geographically and chronologically, to major theoretical and culture-historical controversies and problems of Preclassic highland archaeology. The size, nature, and importance of the site have been underestimated, in part due to limited available information based only on smaller preliminary seasons and a looted tomb and also due to the assumption by many that the very large structures there were Late Preclassic and/or Late Classic. Now a larger long term project there has begun and is completing its first season. Preliminary results confirm that the epicenter structures, including temples of 8 to 11 m in height, were Middle Preclassic with only a few mounds, one large, dating to the Early Classic, but after a clear hiatus. The investigation also reveals the large scale of the site and has identified related small centers. The nature, dating, and location of Semetabaj make it central to interpretation of Middle Preclassic highland and coastal exchange systems. It also falls fortuitously directly into the ongoing controversy on Middle Preclassic chronology. The Semetabaj Regional Archaeological Project will provide evidence and analyses that address these current issues of Preclassic highland archaeology.

[214] *Discussant*

Demarest, Arthur [125] see O'Mansky, Matt

Demarte, Pete (Trent University), Samantha Walker (Trent University), Dan Savage (Trent University) and Melissa Coria (Trent University)

[214] *Weathering the Tropics: The Problem of Archaeological Data Collection and Understanding Settlement Systems, Socio-Ecological Dynamics, Human-Thing Entanglements, and the Resiliency of Tropical Societies*

The settlement sub-project of the Socio-Ecological Entanglement in Tropical Societies (SETS) investigations was executed by engaging a variety of data collection methods in order to assess the development and overall organization of settlements of support populations in a sample of preindustrial tropical societies from South and Southeast Asia, and Mesoamerica. This presentation explores the diverse types, character, and quality of the data employed in the study, and underscores how, when combined within a broader comparative study, the strengths and weaknesses of the various regional datasets can be productively evened out to provide a general understanding of settlement patterns in the preindustrial tropics. Specific attention is paid to the methods utilized in the examination of the dispersed urban settlements characteristic of tropical environments, while also providing a comparison of the utility of each method of archaeological data collection. Data proximity and ground-truthing are argued to be crucial tools that should be used in conjunction with extensive literature reviews, ground surveys, and extant GIS datasets (including lidar) in efforts to examine the complex socio-ecological relationships, human-thing entanglements, resiliency of support populations, individual settlement nodes, and larger political formations.

Demski, Leo (University of Nevada, Reno)

[103] *The Luxury Of Cold: The Natural Ice Industry In Boca, California: 1868–1927*

Before the invention of refrigeration and electrically produced ice, naturally harvested ice was an important seasonal commodity for food storage and heat regulation. In 1852, Boston ice was shipped to San Francisco and sold as a luxury. High demand soon led entrepreneurs to look for closer sources of ice, first in Russian controlled Alaska, and then in the Californian Sierra Nevada Mountains along the newly-completed transcontinental railroad line. The railroad transported ice to customers, utilizing it to ship perishable food items over long distances in refrigerated cars. The town of Boca, in the eastern Sierra, dominated the Californian ice market from the late 1860s–late 1920s, due to its extremely cold and dry conditions, purity of water, and proximity to the railroad. This presentation will discuss the archaeology taking place at Boca, as well as attempting to situate the Sierra ice industry in the broader context of economic and industrial development of the late nineteenth- to early twentieth-century West.

DeMuth, R. Carl (Indiana University Bloomington), Tim Goddard (Adams State University), Joshua J. Wells (Indiana University Southbend), Eric Kansa (Open Context) and Kelsey Noack Myers (Indiana University Bloomington)

[18] *Digital Archaeological Data in All the Classrooms: Case Studies Using the Digital Index of North American Archaeology (DINAA) for Teaching Digital Methods in Graduate and Undergraduate Curricula*

This paper presents case studies in developing information literacy about archaeological methods and heritage resources, involving use of the Digital Index of North American Archaeology (DINAA) in graduate and undergraduate programs at Adams State University and Indiana University. DINAA is a linked open data hub which uses archaeological site definitions as a core from which to explore further information, including excavation and collections data, scholarly publications, and related information from other scientific databases. These examples highlight DINAA's potential for teaching digital archaeological methods, including critical thinking skills about information design, data representation, and reuse strategies. Courses discussed involve heritage management practice and theory, definitions of culture areas and history, and introduction to archaeological science. Perennially critical issues in teaching digital archaeological methods are (1) providing students with primary data or large volumes of data for hands on learning and (2) providing them with affordable software solutions; addressing these issues provides graduating students with important skills for contemporary workplaces that require navigation of diverse datasets and software, often with limited financial resources. DINAA's open data and open-source commitments democratize the educational process for students, and simultaneously provide an avenue for educators to introduce real world data into the classroom. DeMuth, R. Carl [195] see Wiley, Taylor

Deneault, Zoë [263] see Heizer, Melanie

Dennett, Carrie (University of Calgary) and Lorelei Platz (University of Costa Rica)

[156] *Materializing Ritual: Sorcery, Transformation, and Divination in Greater Nicoya*

Themes involving spiritual transformation have long been noted in the material culture of precolumbian Greater Nicoya, with standardized ritual imagery appearing in local Sapoa period (AD 800–1250) ceramic type-classes such as Papagayo and Pataky Polychromes. A recent iconographic reevaluation suggests that at least some varieties from these “independent types” were designed to work together, to complement one another in both ritual messaging and formal function. Here we focus explicitly on the relationship between Pataky Polychrome, Pataky variety, effigy head vessels and Papagayo Polychrome, Alfredo variety, bowls. Together, this unique “set” appears to portray a sorcerer in the act of spiritual—and arguably entheogen-

induced—transformation. The bowl likely served a dual-purpose role in the presentation of the entheogen at consumption and as a 'substance receptacle' (divinatory "vomit-catcher") for the sorcerer's subsequent purge.

Dennison, Meagan (University of Tennessee, Knoxville)

[127] *Ancient Dogs of the Tennessee River Valley*

Skeletal remains of domestic dogs, particularly dog burials, are common from prehistoric archaeological sites in the Southeastern United States. Efforts to describe these ancient canines have traditionally focused on body size and cranial morphology, however, more recently paleopathology has played a key role in understanding ancient canine lifeways and the interactions between humans and domestic dogs. Mortuary analysis can also bolster interpretations of life histories and dogs' roles within human society. This paper describes the mortuary contexts and paleopathology for nearly 50 archaeological dog skeletons from two sections of the Tennessee River Valley—the Western Valley and the Ridge and Valley physiographic provinces. Dogs from the Western Valley date between 7000 and ca. 3500 years BP. and are associated with foraging cultural groups, while dogs from the Ridge and Valley are much later, dating between 900 AD, and 1500 AD and are associated with subsistence systems centered on maize agriculture. The social relationship between dogs and people manifests skeletally in traumatic fractures and/or metabolic diseases, as well as in the way dogs are treated in death. Differences in burial treatment and paleopathology between these two cultural groups indicate that dog lifeways changed within the context of anthropogenic cultural change.

Denoyer, Allen [303] see Cometa, Kaitlyn

Denton, David (Cree Nation Government)

[216] *Wapushukamikw: Sacred Site and Lithic Quarry in Subarctic Quebec*

Traditionally, Wapushukamikw ("house of the hare") was a sacred site for Cree and closely related Northern Algonquian people in subarctic Quebec. Its use as a place of prayer was noted in the early eighteenth century CE by Jesuit missionaries, and some elements of this tradition have continued to modern times. Wapushukamikw, known by archaeologists as the Colline Blanche, was also an important lithic source in subarctic Quebec, used for some 6,000 years. Artifacts of Mistassini quartzite from this source have been found in sites throughout a wide area of subarctic Quebec and well beyond, into the St. Lawrence River Valley and parts of New England. In areas furthest removed from the source, it is often found as offerings in burials. This paper brings together information concerning Wapushukamikw as part of the Cree/Northern Algonquian cultural landscape and suggests a close relationship between the spiritual power of the site and the typically white stone from the quarry, known to Crees as wiinwaapsk ("fat stone").

DePace, Monique and Kathleen McSweeney (University of Edinburgh, Graduate Officer)

[290] *Diet and Dentition on the Black Sea: An Examination of Dental Health and Dietary Reconstruction at Medieval Mesambria*

Dental health and dietary habits from the Bulgarian town of Mesambria have never been investigated for the medieval period. The town has its roots in Mediterranean culture, however, in the Early Byzantine and Medieval periods in Bulgaria, the Slavic Bulgars were vying for power and territory, and Mesambria became caught between the dying Byzantine Empire and the new Bulgarian state. The Bulgars brought with them a different diet, with a preference for millet, meat, and cheeses over the Mediterranean staples of wheat, oil, and wine. Human remains from the Mesambrian Old Town and Necropolis were compared to investigate the dental health of individuals living in medieval Mesambria. Supplementary isotopic analyses from twelve individuals from the Old Town were used in dietary reconstruction, and to support the dental health findings. Possible differences in age, sex, time period, and class between the Necropolis and the Old Town populations were investigated. Numerous significant differences were noted in the frequency of affected teeth between sexes, age groups and between the two populations. Isotopic data suggests that there were slight dietary differences between males and females, and $\delta^{15}\text{N}$ values indicated that individuals buried in the Old Town had elevated marine consumption.

Deppen, Jacob (University of Washington)

[166] *Connected through Things: Connectivity in Iron Age Mallorca*

This presentation examines connectivity in the Late Iron Age on the island of Mallorca. While most case studies of connectivity in the western Mediterranean involve the movement of people and/or the construction of new settlements by nonlocal people, there is little evidence that this occurred in Mallorca. However, there is still abundant evidence that indigenous Iron Age Mallorcans were increasingly connected to the broader Mediterranean and that nonlocal goods were being consumed throughout the island. Mallorca, then, seems to have been a place where connectivity and consumption of nonlocal goods were negotiated on decidedly local terms. This presentation will outline what we know about the consumption of nonlocal goods in Mallorca during the Iron Age while also examining how the absence of nonlocal individuals impacts how we think about studies of connectivity and contact between groups.

Deppen, Jacob [118] see Hunt, David

Depret-Guillaume, Patrick (University of Virginia)

[303] *God's Empire: Ritual, Repression, and Resistance on the Rio Grande, 1300–1848*

This interdisciplinary project evaluates the relationship between Spanish and indigenous religious practices and their respective political objectives in protohistoric and colonial New Mexico. Beginning with a discussion of the emergence of a new religious idiom in the Pueblo world during the fourteenth century CE, I investigate the entanglement of political and economic forces with religion up to the conquest of the region by Anglo-Americans in the mid-1840s. In doing so, I highlight the myriad connections between what contemporary society, in the interests of sublimating the violence of ideological struggle, has sought to separate: the sacred and the secular. I demonstrate that in New Mexico, religion never operated in a vacuum, nor was this desired; rather, it was intentionally mobilized as a tool of political and economic action. To that end, I employ archival/ethnohistoric, archaeological, and ethnographic sources to deconstruct the categories of "religion," "politics," "economics," and "society" themselves.

Der, Lindsay (Stanford University)

[73] *From Goddesses to Zoomorphs: Figuring Out Figurines at Çatalhöyük*

The infamous seated goddess, flanked by two leopards, is perhaps the most sensationalized figurine to have been unearthed at Çatalhöyük, prompting narratives of prehistoric cults and religion. Yet research conducted since its discovery by James Mellaart has shown that zoomorphic, rather than anthropomorphic, types are predominant in the figurine assemblage. In this paper, I trace the history of changing recording systems, analytical methodologies, and interpretations of figurines at Çatalhöyük. These new approaches have not only reconfigured our understanding of ritual and symbolism, but also revealed spatial and temporal continuity and variation across the settlement. In particular, research carried out on the figurines in the last five years, has illuminated the emphatic role of animals in the everyday lives and experiences of the Neolithic residents of the site. The figurines,

along with other animal materializations, can thus reveal new insights into the complex of human-animal relations and ontological geographies at Çatalhöyük. Furthermore, these studies help to contextualize the site within broader patterns of phenomena related to symbolism, ritual, and social change at the origins of agriculture in the Middle East.

[73] Chair

Derr, Kelly (Historical Research Associates, Inc.), Colin Grier and Adam Price

[194] *Changing Ecologies and Altered Landscapes: A 13,500-Year Paleoecological Record from Galiano Island, British Columbia*

A high-resolution lake sediment core recovered from Shaw's Bog on Galiano Island provides a window into the paleoecology of the island and region back to the Late Pleistocene. The extensive time depth represented offers an opportunity to evaluate ecology and climate prior to the known arrival of people in the southern Gulf Islands. It also provides a mechanism to measure impacts on the local ecology following the establishment of major, long-term village locations such as Dionisio Point and Montague Harbor in the later Holocene. Using fossil pollen, charcoal, and phytoliths identified in the core, we compare natural and potentially anthropogenic changes in the local and regional ecology and fire regimes of Galiano Island. Changes in charcoal frequency and morphology demonstrate shifts in fire frequency and fire regimes during the Holocene, and these are evaluated with respect to variability in the pollen and phytolith record. These paleoecological data, coupled with archaeological evidence for long-term landscape construction at nearby village sites, suggest that Salish peoples engaged a complex and dynamic landscape that both sustained and reflected increasingly place-based lifeways in the southern Gulf Islands.

Deryck, Sean, Russell Cutts (University of Georgia, Koobi Fora Field School), David R. Braun (George Washington University, Koobi Fora Field Sch) and J.W.K. Harris (Rutgers University, Koobi Fora Field School)

[154] *Ongoing Excavations at FxJj20Main-Extension-0, Koobi Fora, Kenya*

Original excavation of FxJj20 sites in Koobi Fora, Kenya revealed nine oxidized patches described as combustion features associated with artifacts. Here we describe new excavations at a nearby new locality described as FxJj20Main-Ext-0. This excavation extends previous work in order to explore potential combustion features with newer techniques. Three squares adjacent to a reddened feature yielded 18 bones and 33 stone artifacts. All bone was fragmented. Most stone artifacts were basalt. Nearest neighbor analysis showed nonrandom clustering on both the horizontal and vertical planes with minimal evidence of postdepositional disturbance.

Des Lauriers, Matthew (California State University, Northridge)

[393] *Inheritance, Innovation, and Interaction: The Motivations for and Consequences of Social Interaction in the Context of Initial Settlement*

While providing a general outline of several initial settlement strategies pursued across the Americas, I argue that social networks between the small-scale communities involved would be established rapidly upon arrival. Certainly, the events of initial contact and process of network formation would have occurred within a sub-generational time frame. The flow of material goods, genes, and information between members of the small-scale pioneering communities is essential to the survival of initial populations and their continued expansion. As they moved into a new landscape, the establishment of these conduits would have been high on the priority lists of the early colonists leading us to ask several questions. Do the varied Terminal Pleistocene technological assemblages of the Americas indicate the existence of widespread and distinct cultural traditions? Are the expansive geographic areas of North and South America encompassed by some of these traditions commensurate with interaction systems? Finally, does the increasingly regionalized material culture in the millennia after ~8000 BP indicate a reduction in the geographic scope of networks or a more complex change in the role of interaction among Archaic populations?

Desilets, Michael [302] see Toney, Joshua

Desrochers, Marie (University of Central Arkansas), Marvin Rowe (Conservation Laboratory of the Museum of New Mexico), Sally Cole (Fort Lewis College Department of Anthropology) and Karen Steelman (Shumla Archaeological Research & Education Center)

[392] *Lead and Zinc Pigmented Mural Paints: Lowry Pueblo Great House, Southwest Colorado*

We used numerous techniques to study the white step pattern murals of Lowry Pueblo Kivas A and B: visual analysis, portable X-ray fluorescence, scanning electron microscopy with an energy dispersive X-ray spectrometer, and powder X-ray diffraction. Elemental analyses identified lead and zinc in the shiny bright white paint layer and calcium in the dull white paint layer. X-ray diffraction confirmed zinc oxide and lead sulfate pigment minerals in the shiny, bright white paint layer, whereas calcium carbonate was identified as the pigment for the dull white paint layers. Radiocarbon dating places mural production at 1020–1185 cal AD, consistent with occupation at Lowry Pueblo Great House. Because this underlying shiny, white paint layer is from an earlier painting event than the dull white, the lead paint layer could not be due to a modern addition. Selection of this lead and zinc pigment by kiva decorators produced a desirable paint finish; however, lead ore processing and paint manufacture likely had negative health implications.

Desrosiers, Dianne [394] see O'Boyle, Robert

Devio, Jessica (Washington State University)

[173] *Interpreting Maya Economic Activity Using Paleoethnobotany*

Paleoethnobotany is a subfield of archaeology that requires an extensive knowledge of archaeology and botany. Because highly specialized skills are required, presenting data can be difficult. Botanical data must be conveyed in a way that is understood by fellow archaeologists while adhering to standards of botanists. Conveying this information becomes even more difficult when we begin to combine micro and macro botanical methods. Botanical datasets can contribute to a wide range of topics that enhance our understanding of precolumbian societies. This paper focuses on the contribution that paleoethnobotany can make to our understanding of ancient economies. I focus not only on the subsistence economy, but the contributions to our understanding of economic production, distribution, and consumption on a broader scale. I present a case study from the site of Xunantunich in Belize. Thousands of small unifacial bladelets associated with Late Classic Maya households were discovered at the site and were initially interpreted as crafting tools. A sample of 38 previously washed bladelets and 62 unwashed artifacts yielded starch from several plant species. The results suggest that at least one household at Xunantunich engaged in plant processing activities that exceed that of normal household production activities.

Devlin, Joanne

[79] *Beyond the Basin: Forensic Archaeology in Tennessee*

As professors at Hamilton College, G. Tom Jones and Charlotte Beck taught their students how to engage in research and how to be effective instructors in the classroom. I have used these lessons to build a career in forensic anthropology. My long-term research at the Forensic Anthropology

Center at the University of Tennessee has centered on establishing techniques to best examine burned bones and also on the application of geophysical methods to locate clandestine graves. This research has led to improved means for handling, identifying, and recovering burned bone while the geophysical work on experimental graves has demonstrated the utility and reliability of ground-penetrating radar in forensic investigations. Importantly, this work has significantly contributed to the development of training programs for students and Law enforcement personnel. The success of my forensic work is directly attributable to the influence of Tom and Charlotte and their dedication to students and anthropological science.

DeVore, William [185] see Dye, David

DeVos, James [227] see Kintigh, Keith

Dewan, Eve (Brown University)

[247] *Repatriation in Rhode Island: NAGPRA in Practice at a New England Museum*

Located within a city park in Providence, Rhode Island, the Roger Williams Park Museum of Natural History has been a popular scientific and cultural institution since it was founded in the late nineteenth century. Only about 1% of the Museum's quarter million pieces are currently on display. Included in this vast collection are approximately 25,000 archaeological and ethnographic objects from around the world, a number that was higher prior to the passage of NAGPRA in 1990. Since this pivotal legislation was introduced over two decades ago, the Museum has worked on numerous claims for the repatriation of cultural property and ancestral remains, with varying degrees of success. Using the Roger Williams Park Museum as an institutional case study leads to a more concrete understanding of how NAGPRA affects museum realities, as well as what ethical and practical challenges arise from it. Three cases in particular highlight the law's impact and the inner workings of the Museum's changing relationships with Indigenous peoples and their material culture in southern New England, throughout the United States, and across the globe.

Dewar, Robert [32] see Douglass, Kristina

DeWitt, Regina [121] see Nowell, April

DeWitte, Sharon (University of South Carolina)

[235] *Sex Differences in Pre- vs. Post-Black Death Trends in Developmental Stress Markers*

Previous research revealed trends in periosteal new bone formation in medieval London that are consistent with improvements in health following the Black Death (c. 1347–1351). However, periosteal lesions can occur in response to a wide variety of factors at any age, so it remains unclear how the epidemic affected patterns of physiological stress specifically among subadults. To further our understanding of changes in physiological stress before and after the Black Death, this study examines sex-based variation in temporal trends in two developmental stress markers: linear enamel hypoplasia (LEH) and short tibia length (a proxy for stature). The samples (n = 879) are from medieval London cemeteries and dated to an Early Pre-Black Death (AD 1000–1200), Late Pre-Black Death (AD 1200–1250), or Post-Black Death (AD 1350–1540) period. The results of Chi-square and t-tests indicate that before the Black Death, males experienced an increase in LEH frequency and a decline in stature, but these did not change among females. The results also indicate declines in LEH and increases in stature for males but decreases in stature for females after the epidemic. These patterns might reflect sex differences in physiological buffering during childhood or unequal access to resources after the Black Death.

DeYoung, Jessica [126] see Steelman, Karen

Dhody, Anna [14] see Mower, Courtney

Diệp, Hoàng [113] see Kelley, Eric

Diaz, Alejandra (University of British Columbia), Anna Marie Prentiss (University of Montana), Rebecca Macdonald (University of British Columbia), Olaf Nehlich (University of British Columbia) and Michael P. Richards (Simon Fraser University)

[50] *Diet and Mobility on the Canadian Plateau: Isotopic Analysis of Domestic Dogs and Other Fauna from the Bridge River Site*

This study reports on carbon, nitrogen, and sulfur isotope analyses of dog remains and other fauna from the Bridge River site in the Mid-Fraser region of the Canadian Plateau. We discuss these results in relation to dietary variability and resource mobility through time and in the relationships between dogs and humans. While dogs are not a direct proxy for humans in dietary isotope studies, their diets are influenced by human dietary practices, and therefore indicative of human subsistence strategies and activities. Similarly, evidence of dog mobility reflects the spatial interactions between human groups and resources. Dietary results demonstrate that while salmon played an important part of dog diet at Bridge River, variability occurs across age groups and culture periods. Mobility of dogs and potential differences in origin through time is also indicated.

Diaz, Diana (California State University, Northridge)

[98] *Engaging the History of the San Fernando Valley: Collections and "Synergy" at CSUN*

Perceptions of southern California's San Fernando Valley have long pertained to its relationship to adjacent Los Angeles, with the region over time characterized as either agricultural hinterland or faceless suburbia. Such stereotypes overlook the numerous historical associations and resources of the region, in the process subverting the identities and "communitas" of valley residents. In 2016 courses taught in the Department of Anthropology at California State University-Northridge (CSUN) have been collaboratively designed to create "synergy" associated with the San Fernando Valley in regard to history, space, and place. A particular focus has been archaeological resources from numerous valley localities curated at CSUN, including artifacts from Mission San Fernando, Rey de Hispana, and numerous nineteenth-century "adobes." These collections have never been synthesized, so evaluation in classroom laboratory settings offers the opportunity to engage local history and to involve students in the process. The results have expanded perceptions of the value of archaeological resources, the importance of local history, and the critical need for community engagement.

Díaz, Mauricio [71] see Barrios, Edy

Díaz-Andreu, Margarita [360] see Vargas, Amilcar

Dibble, Harold [40] see Leader, George

Dickson, Antony [100] see Donahue, Randolph

Diederichs, Shanna (Crow Canyon Archaeological Center)

[266] *A Frontier in Bloom: Social Implications of Architectural Diversity and Conformity during the Colonization of the San Juan Region of the Northern Southwest*

Behavioral conformity and, its inverse, behavioral diversity are social adaptations wielded by small scale agricultural societies faced with change. By the sixth and seventh centuries AD, the Basketmaker III period, long standing conflicts in the San Juan region of the northern Southwest had abated and new territories opened to agricultural colonization. Frontier colonization is by nature a contentious process that usually results in violence, displacement, and the reinforcement of factions. In contrast, the San Juan Region saw an unprecedented period of peace and integration during colonization. This study demonstrates how Basketmaker III populations mitigated conflict by signaling solidarity and common identity in the Frontier through architectural conformity at community centers while allowing for architectural variation and expression at single family farmsteads. These practices, in turn, may have set the stage for the development of kinship and non-kinship based institutions in the Ancestral Pueblo world.

Diederichs, Shanna [89] see Wurster, Bethany

Diego Luna, Laura (Posgrado en Estudios Mesoamericanos UNAM)

[200] *Reconocimiento arqueológico de la cuenca alta del Río Grande (Sierra Juárez) de Oaxaca: Método y avances de la investigación*

La Sierra Juárez es una región montañosa ubicada al noreste de los Valles Centrales de Oaxaca. Pese a ser adyacente a ésta, hasta el momento, las investigaciones arqueológicas se habían enfocado en pocos sitios. En esta ponencia se expone el diseño de la investigación regional actualmente en curso: las preguntas; el método, el cual puede emplearse en otras zonas montañosas con características topográficas similares, y que integra la interpretación de la geoforma y de ortofotos digitales, al tiempo que se apoya en los GIS para la planeación del reconocimiento y procesamiento de los datos; así como la manera en que se efectuaron dichos reconocimientos y algunos resultados preliminares.

Diego Luna, Laura [217] see Spores, Ronald

Diehl, Robert (University of Colorado Denver)

[152] *Toward an Interpretive Framework for Burnt Ostrich Eggshell: An Experimental Study*

Ostrich eggs have been a valuable resource for Sub-Saharan populations for thousands of years, offering a rich nutritional source as well as a means of transporting water. While burned ostrich eggshell (OES) fragments are common at sites, it is difficult to determine whether they were subsistence refuse or the disposed remnants of canteens. Current tools for analyzing OES burning conditions involve expensive and time consuming isotopic analysis or scanning electron microscopy. This research aims to develop an interpretive framework for differentiating cooked OES from that burned through disposal or natural circumstances based on easily observed and measured criteria. This will be achieved through burning experiments with the intention of distinguishing shells heated while the egg was whole or in fragments as well as surface or subsurface burnings. This poster will present data regarding patterns of coloration, surface morphologies, and physical properties. This research will have implications for site interpretation in terms of seasonality, subsistence strategies, mobility, and paleoenvironmental reconstruction.

Dieter, Karissa [75] see Casanova Vasquez, Erick

Diez Barroso Repizo, Alberto (Instituto Nacional de Antropología e Historia)

[353] *Cultural Practices and Trade Routes in the Sierra Norte of Puebla during the Middle Formative. Archaeology of the Teteles De Avila Region*
The first systematic excavations at the archaeological site of "Teteles de Avila Castillo," in the northeastern regional province of Puebla, Mexico, in 2015, resulted in the identification of elements and cultural practices that allow us to locate this settlement in an early chronological period for this region. Additionally we can understand the relationship between the central highlands of Mesoamerica and the northern Gulf of Mexico, previous to the Teotihuacán upswing.

Diez-Martin, Fernando [305] see Mercader Florin, Julio

Dillehay, Tom

[382] *Where the Land Meets the Sea: Preceramic Complexities on the North Coast of Peru*

Interdisciplinary investigation of the large coastal mounds of Huaca Prieta and Paredones and their associated domestic settlements represent Preceramic human occupation as far back as ~14,000 cal BP. Research at these sites has documented a long Preceramic sequence from the activities of the first maritime/terrestrial foragers from the late Pleistocene to early Holocene to the construction of the mounds and the introduction and development of agriculture and monumentality from the middle to late Holocene. The community of sites in the study area emerges as innovative, complex and ritualized, with long distance contacts in several areas of the Central Andes. As yet this early community has no known antecedents in the wider Andean region. The social and ontological complexity of the sites is discussed and related to later societies.

[134] *Discussant*

Dillehay, Tom [382] see Goodbred, Steven

Dillian, Carolyn (Coastal Carolina University)

[394] Discussant

Dillmann, Philippe [323] see Hendrickson, Mitch

Dillon, Katherine (Binghamton University)**[260] *A Depositional Analysis of Pit Features at the Pocumtuck Fort***

Subsurface features are a basic unit of archaeological analysis, yet there is surprising little standardization in their identification, classification and analysis. In the northeastern region of the United States most archaeologists rely on simplistic pit feature typologies. I argue that studying features by deposit rather than as whole units allows for a clearer understanding of separate cultural depositions as indexes of specific past practices. The pit feature assemblage at Area D (19FR415), a mid-seventeenth-century Pocumtuck site in Deerfield, Massachusetts, demonstrates the potential for depositional analyses of pit features. I identify the range of past human practices manifested in these features through a systematic sorting of deposits based on 24 recorded attributes, which measure and describe deposit morphology, soils, and content.

Dilores, Kurt (Louisiana State University) and Heather McKillop (Louisiana State University)**[281] *Analysis of Marine Sediment to Explain Sea Level Rise in Paynes Creek National Park, Belize***

Archaeological research in Paynes Creek National Park, Belize provides insight into environmental changes over time. Sea level rise has affected coastal Maya settlements during both the Classic and Postclassic Periods. Marine sediment samples from five submerged Classic Period Maya sites were exported under permit to the Archaeology lab at Louisiana State University where the samples were analyzed using loss-on ignition and microscopic sorting. The results from loss-on ignition as well as microscopic sorting of these marine sediment samples will be presented. Loss-on ignition was used to determine the percent organic matter in each of the marine sediment samples. Microscopic sorting showed the composition of the marine sediment. A high percent of organic matter in conjunction with red mangrove (*R. mangle*) roots is indicative of mangrove peat. Mangrove peat is an indicator of actual sea level rise because *R. mangle* has been shown to keep pace with the rise of sea level. The research presented in addition to material cultural remains contributes to our understanding of the Maya as well as the effect of global climate change on coastal Maya communities.

Dimoula, Anastasia [250] see Garcia, Arnau

DiNapoli, Robert J. (University of Oregon)**[180] *Reevaluating the Precolumbian Colonization of the Caribbean Using Chronometric Hygiene and Bayesian Modeling***

The timing and pattern of initial human arrival to the Caribbean islands is discontinuous and anomalous, especially considering their proximity to both mainland areas and adjacent islands. With the exception of Trinidad, which was probably colonized ca. 8000 BP—but was connected to mainland South America during the late Pleistocene/early Holocene (and remains close to Venezuela)—some of the Antilles appear to have been colonized quite early ca. 7000–6000 BP, while others were settled centuries or even millennia after nearby land masses. In addition, some islands have no documented precolumbian settlements, which is curious given the generally small area and intervisibility of most islands. To better examine the pattern of prehistoric settlement in the Caribbean, we have compiled the largest database of radiocarbon dates currently available that consists of almost 2,000 dates. Using a strict chronometric hygiene protocol and a series of Bayesian models, we compare refined colonization estimates for more than 20 islands with several hypotheses that address prehistoric population dispersals in the region. In addition, our results highlight the need for improved radiocarbon dating protocols to help refine chronologies and provide more robust interpretations of island colonization.

[180] Chair

DiNapoli, Robert J. [302] see Lipo, Carl

Dine, Harper and Traci Ardren (Department of Anthropology, University of Miami)**[329] *Famine Foods and Food Security in Ancient and Modern Yaxuna***

Food as an object of study can reveal relationships between biological necessity, culture, and oppression. The 1996 World Summit on Food Security declared that “food should not be used as an instrument for political and economic pressure,” yet archaeology shows myriad ways in which food access was manipulated in the past, and the ramifications of those manipulations. In the Maya area, prestige foods have tended to be the focus of analysis. In this paper, we emphasize the importance of the archaeological study of foods of low social status, including those referred to as famine foods. Through a survey of rejolladas and house gardens in the modern village of Yaxunah, and a review of the literature on Maya agriculture in times of hardship, we present a working list of the most efficient “famine foods” in Maya history, an analysis of the potential stigmas tied to those foods, and a portrait of the changing nature of food security insurance. We tie these observations to modern attitudes toward low status or poverty foods held by Yucatec Maya speakers in Yaxunah. We aim to illuminate the history of Maya food-insecure households and local efforts to integrate new foods during times of social disintegration.

Dine, Harper [329] see Wesp, Julie K.

DiSantis Humphreys, Clarissa [122] see Humphreys, Stephen

Diserens, Kasey (University of Pennsylvania)**[280] *The Cycle of the Living Dead: Ruins, Loss, and Preservation in Tihosuco, Quintana Roo***

Why does the threat of loss strike fear into our hearts as heritage professionals and archaeologists? Why do we not understand the loss of cultural practices as part and parcel of being human, and accept that loss is not the opposite of heritage, but in fact an integral part of it? We need to transform the discourse surrounding loss, embracing it as an integral part of culture rather than avoiding it. This paper will demonstrate how such threats impact the decision making processes surrounding historic structures and ruins in Tihosuco, Quintana Roo. It seeks to challenge the prevailing notion in the heritage preservation field that our work necessitates freezing the past in perpetuity at a given point, or only allows for sanctioned changes. This fear of loss and failure to allow for adaptation can create a cycle of “living dead” within heritage assets: aging architectural and archaeological resources that are not being used to their full potential, or are left to deteriorate with no thought to their present or future value. In order to break this cycle, we need a people-centered heritage preservation-one that adapts our methods to engage with the past and plan for the future.

[280] Chair

Disque, Candice (New Mexico State University)

[59] *Can Architecture Reveal Elements of Ethnicity? A Case Study Using Ancestral Puebloan Built Form Aimed at Identifying Intracultural Variation in the Greater Mesa Verde Region during the Pueblo III Period*

Settlement locations and the resultant built form are an essential part in understanding the social and cultural ideals of prehistoric peoples. Vital information pertaining to intracultural diversity is lost when the ideals, beliefs, values, and identities of multiple communities within a culture are homogenized. Landscape analysis of the Sand Canyon Pueblo community, Cajon Mesa communities, and the Ten Acres Community has revealed distinct differences in site location and orientation; masonry style; and public architecture. This study focused on large Pueblo III period community centers in the Four Corners region to assess the presence of intracultural variation; a presence that may further be used to identify possible ethnic differences between said communities. Ethnicity is not the same as culture, but rather allows for an individual to identify with a collective group. This paper will present the results of the study, showing that architecture serves as a medium of communication; a piece of material culture imbued with the symbolic patterns of a given group that can be used to evaluate intracultural variation among the Ancestral Pueblo people.

Ditchfield, Kane [302] see Manne, Tiina

Divido, Jared (Indiana University of PA)

[191] *Testing the Use and Reliability of 3D Scanning Technology in the construction of a Digital Comparative Faunal Bone Collection*

This poster presents methodologies for testing the use of 3D scanning in its ability to capture quality 3D images of faunal bones for comparative purposes. An investigation of prior studies confirms that 3D scanning has successfully been used in aspects of archaeological research. Yet, the full potential for the use of 3D scanning in zooarchaeology is still unclear. At present, zooarchaeologists often have to resort to loaning physical bone specimens from other institutions when comparative examples are not available in their local collections. The process of needing to borrow physical comparative collections can be timely and costly to the researcher. This research utilizes a MakerBot 3D Digitizer to test its accuracy for creating 3D representations of faunal bones. In particular, this project focuses on scanning various waterfowl and fish species. The long-term goal for testing the use and reliability of 3D scanning is to further aid in the development of digital faunal bone comparative collections. A digital repository of faunal bone comparative collections could drastically increase the availability of zooarchaeological collections to researchers across the globe. Consequently, this will bolster the potential for collaborative research efforts across the archaeological community since digital faunal collections could easily be shared among institutions.

Dixon, Christine C. (Green River College), Rachel Egan (University of Colorado, Boulder) and Nan Gonlin (Bellevue College, WA)

[293] *Natural Springs: A Critical Life Force in Ancient Costa Rica*

Water is a life sustaining substance, sought after, fought over, and revered in both the past and present. The relationship between humans and water resources is an essential component of our human history that warrants archaeological focus. Natural springs have been identified as key locations of archaeological remains throughout the Americas—places inherently intermixed with practices of drinking, bathing, cooking, and worship of the divine. In Costa Rica, the documentation of Silencio Phase (750 CE–1020 CE) footpaths has led to a critical discovery of the significance of springs in this ancient landscape. This paper contextualizes recent discoveries in the Arenal area of Costa Rica by utilizing case studies of the meanings and uses of springs throughout the Intermediate and Mesoamerican regions. Findings suggest that the spring as a focus of investigation is an understudied component of Costa Rican archaeology and a vital component of ancient life.

Dixon, Christine C. [80] see Egan, Rachel

Dixon, Donald [17] see Budhwa, Rick

Dobereiner, Jeffrey (Dartmouth College) and Rebecca B. Gonzalez Lauck (Proyecto Arqueológico La Venta)

[3] *Voted Off the Olmec Island: Remote Sensing and Regional Reconnaissance Surrounding La Venta, Tabasco, Mexico*

This paper reports on the first stage of a regional settlement study initiated in 2016 by the Proyecto Arqueológico La Venta (PALV). Previous work beyond the primary site core of La Venta, Tabasco, Mexico, has primarily focused on a limited subset of regional features. PALV's inaugural season of field reconnaissance, alongside analysis of 5-m resolution lidar and historic aerial photos, demonstrates that Formative and Post-Classic period occupations beyond the main La Venta "island" were likely more extensive than previously documented. This work is improving chronological and spatial resolution on the cultural trajectory of the Gulf Coast, enabling improved comparative analyses of emergent social complexity in Mesoamerica more broadly. Going forward, this multiyear project will draw upon a broader range of techniques, including geological coring and ground-based remote sensing, to produce a comprehensive model of settlement in La Venta's poorly understood hinterland. The expanded catalogue of archaeological sites in this region will also serve to help protect heritage from ongoing oil prospection and pipeline production by PEMEX.

Dobney, Keith [85] see Ameen, Carly

Dobrez, Patricia (AURA/ARARA)

[28] *The Intelligent Tool: The Body's Role in Making and Reading Tracks in Life and Art*

The approach of this paper is ecological, taking account of affordances for communication available to bodies interacting with environments. My focus is on the minimal affordance meanings of marks which, while ultimately lending themselves to symbolic use, have the capacity to disclose our real-world situatedness in unambiguous and immediate ways. I argue that the place to begin an inquiry into graphing is with human and animal traces in the landscape and the manner in which these have been represented in such rock art corpora as the Australian tracks-and-lines Panaramitee.

Dobrez, Livio (Australian National University, retired)

[210] *Rock Art Categorization*

Over the past ten years I have sought to elaborate a new categorization for rock art images and one based on analysis of visual perception bolstered by cognitive psychology experiments and current knowledge of visual system neurophysiology. The result has been a suggestion for three classes of image, viz the Canonical (mostly profile), Narrative (scene), and Performative (frontal). At the same time Patricia Dobrez has added two possible classes represented by hand traces and by tracks. In this paper I will give an account of this categorization, focusing on the idea of a scene. I would also like to

ask whether any of the above classes might claim historical priority, whether any might have some sort of originatory claim, and whether any might offer specific insights into human cognitive or aesthetic development.

Dockrill, Stephen [224] see Maher, Ruth

Dodd, Lynn (USC), Kevin Mercy (USC), Nolan Leuvano (CSU, Dominguez Hills) and Su Jin Lee (USC)

[300] *Analysis of Spatial Characteristics and Traditional Knowledge of Freshwater Springs as a Foundation for Predictive Settlement Modeling and Identification of Submarine Groundwater Discharge*

Modeling of late Pleistocene and early Holocene coastal regions in the northern Channel Islands and globally has provided important foundations for understanding impacts of sea level rise on the archaeological record, near coastal communities and environments during the past 20,000 years. A complex, effective model of suitable coastal locations for human settlement and habitation takes into account myriad variables, including resources such as water and less-quantifiable, cultural causes. The research reported here details initial research into forms of local and traditional knowledge about freshwater, and reports on geospatial analysis of freshwater on Santa Catalina Island, one of the southern Channel Islands off the coast of southern California. With Stage Three water rationing being instituted, freshwater sources play an ever more important role in sustaining Catalina Island. Spring locations, terrain parameters, geology, and landscape parameters, including elevation, slope, aspect, land cover, and geology were analyzed. These data comprise a foundation for our surveys to define and document submarine groundwater discharge around Catalina Island; support a fuller understanding of the water balance and hydrological systems; and are valuable in modeling human settlement, past, present, and future, on this island.

Dodd, Lynn [189] see Hanson, Eric

Dodd, Walter (California State University, Fresno)

[105] *How Were Hohokam Palettes Used? Testing a Novel Hypothesis*

Palette means "little shovel" in French. The name derives from a commonly held belief that these curious objects were shallow, hollowed-out containers in which paint pigments were prepared. Another suggestion is that they were used as snuff trays, i.e., surfaces for grinding up hallucinogens prior to chewing or inhalation. This paper advances a new hypothesis with testable implications. It is argued that palettes were employed as mirrors, possibly in ritual contexts. Test results from a series of simple experiments are presented that enable tentative acceptance or outright rejection of the hypothesis. Relevant facts from archaeology, ethnography, geology, and physics are interwoven to build and try a case for specular reflection.

Dodge, Robyn (University of Texas at Austin), David M. Hyde (Western State Colorado University) and Estella Weiss-Krejci (Institute for Oriental and European Archaeology, A)

[83] *La Milpa East, Hun Tun, and Medicinal Trail Communities: Ancient Maya Hinterland Settlements East of La Milpa, Belize*

The hinterland east of La Milpa is distinctive of an upland landscape with bajos on its edges, a few formal courtyard groups, monuments, and numerous informal clusters of mounds. Multiple landscape modifications such as terraces, depressions, chultuns, and linear features are present in these eastern hinterland settlements as well. This paper will provide an overview of the excavations into three specific hinterland communities: La Milpa East, Hun Tun, and the Medicinal Trail Community, as well as associated aguadas, or seasonal water holes, and dry depressions to document variable strategies of ancient Maya economy and water management. Archaeological evidence will be discussed as it relates to the function and interpretation of these hinterland settlements and the role they played in contributing to the larger, regional influence of the La Milpa polity.

Dodrill, Taylor, Nicholas P. Jew (University of Oregon), Scott M. Fitzpatrick (University of Oregon), Connor Thorud (University of Oregon) and Martin Nelson-Harrington (University of Oregon)

[46] *New Archaeological Site Recording and Assessment along the Southern Oregon Coast*

As part of a newly established University of Oregon field school along the southern Oregon coast in cooperation with the Coquille Tribe and Oregon State Parks, we conducted a pedestrian survey of Bullard's Beach State Park. During systematic survey across the southern portion of the park, we relocated known prehistoric sites, identified and mapped several new ones, and assessed site condition for each. Because the last major survey had taken place more than 20 years ago, this was an opportunity to examine how these sites may have changed over time as a result of various natural processes and human activities. Our results, garnered from a combination of ground survey, site record comparisons, and satellite imagery dating back to 1994, revealed that many of these coastal sites are actively succumbing to erosion from wind, rain, and tidal action. In addition, we identified cases of looting that have caused damage to subsurface deposits. Future research will focus on investigating a number of sites in the park to determine the time frame of native occupation, maritime and subsistence adaptations through time, the degree to which these sites are under threat, and how adverse effects might be mitigated to ensure their long-term protection.

Dodrill, Taylor [223] see Jew, Nicholas P.

Doelle, William (Archaeology Southwest)

[206] *Discussant*

Doering, Briana (University of Michigan)

[89] *Investigating a Late Holocene Subsistence Transition North of the Alaska Range: Compelling Results from Two Archaeological Sites*

Geospatial analyses on dated sites across central Alaska suggest important subsistence changes occurred in the region between 4,000–2,000 years ago. A significant shift from a general foraging strategy to a targeted collecting strategy appears to have occurred during this time, and recent investigations at two archaeological sites dating to this period have begun to shed light on the timing and extent of this subsistence shift in a specific region of central Alaska.

[314] *Discussant*

Doershuk, John (University of Iowa)

[342] *Exploring Potential Ancient Human-Proboscidea Interaction at Lake Red Rock, Marion County, Iowa*

Discoveries of juxtaposed proboscidean remains from a single individual are rare in the Midwest and there are no known human-occupied pre-Holocene sites in Iowa with good preservation. The Lake Red Rock (Marion County, Iowa) discovery locale has yielded preserved mammoth remains—a clear

indicator of late Pleistocene (> 10,000 years ago) context—and the suggestion of possible human interaction. If validated such a site will be a first in the state and among only a few in the nation. The grant-funded project team conducted intensive, multidisciplinary (geomorphology, geology, paleontology, archaeology) field investigations for two weeks in late spring of 2016 to collect key environmental context and archaeological data from an actively eroding shoreline context. Recovery of a single stone artifact from the same location as the proboscidean bones is suggestive human activity co-occurred with the mammoth. Detailed laboratory investigation of recovered remains and associated sediments are underway including efforts to extract and date bone collagen. This poster will present the results of the field and lab efforts.

[256] *Discussant*

Dogandžić, Tamara [87] see Warren, Shannon

Dojack, Lisa [17] see Smith, Sarah

Dolan, Patrick (Amec Foster Wheeler) and Colin Grier (Washington State University)

[387] *Centralized Households and Decentralized Communities: Economic Integration in a Marpole Period Plankhouse Village*

The Marpole Period (2500 to 1000 BP) was a time of social transformation in the Salish Sea region of the Northwest Coast of North America. During this period, social and economic relations became increasingly bound up in the operation of centralized, long-lived, multifamily households. Yet, centralization arguably failed to extend far past plankhouse walls, producing regionally decentralized economic communities. This paper examines the processes underlying this pattern from the vantage point of inter-household interactions in the Marpole Period plankhouse community at the Dionisio Point site (DgRv-003) on Galiano Island in southwestern British Columbia. A recent examination of tool kit assemblages from contemporary households at the site illustrated how several pursued common suites of subsistence strategies. Here, we extend this analysis to the rest of the village and contrast these data with faunal evidence for household consumption practices. The results are consistent with patterns of household economic autonomy and by implication the operation of geographically decentralized communities. These patterns are in contrast to processes elsewhere on the coast where rising economic centralization within households appears to have been linked to greater integration between households.

Dolan, Sean (Los Alamos National Laboratory)

[368] *When Is a Fieldhouse? Reconsidering Fieldhouses on the Pajarito Plateau Using GIS Modeling and Excavation Data*

Archaeologists often assume that Ancestral Pueblo groups in the North American Southwest built small one- to three-room structures to serve as temporary fieldhouse shelters for extracting agricultural resources during the farming season, and to minimize transportation to and from their larger villages. If fieldhouses were associated with agriculture, then they should be found near agriculturally productive fields. To determine if there is an association between agriculture and fieldhouses during the Coalition and Classic periods (AD 1200–1600) on the Pajarito Plateau in north-central New Mexico, I present results from a GIS modeling study that incorporates the Revised Universal Soil Loss Equation and excavation data from fieldhouse sites located at Los Alamos National Laboratory (LANL). Further evaluation of what these small sites represent will be necessary if this study identifies that some fieldhouses were not built to assist with agriculture. Fieldhouses are the most ubiquitous site type on the Pajarito Plateau, and the results from this study impacts future interpretation and management of these cultural resources at LANL.

Dolan, Sean [366] see Madsen, Alan

Dolfini, Andrea (Newcastle University, UK)

[178] *Science and Archaeology: An Object-Centered Perspective*

According to Kristian Kristiansen, archaeology is now undergoing a major paradigm-shifting phase akin to the ones that defined the discipline in the mid-1800s and mid-1900s. He dubbed it “the third science revolution,” for fast-developing scientific methods, chiefly A-DNA and stable isotope analyses, sit at the core of the current changes. Arguably, similar if less visible changes are occurring in material culture studies. These are fostered by the marrying of new theoretical approaches (e.g., materiality and symmetrical archaeology) with new, or newly expanded, analytical methods (e.g., metalwork wear analysis). The paper discusses the implications of recent material culture research for the future of our discipline, focusing in particular on the wear analysis of European Bronze Age metalwork. It is argued that this research method has opened up a new window into the middle life-cycle of prehistoric bronzes, which were previously mainly studied for their production technology or deposition practices. Case studies will be discussed based on the Newcastle-led “Bronze Age Combat” project. These will show that the integration of meaningful, theoretically informed field experiments and the microscopic analysis of ancient and replica weapons are needed to reconstruct prehistoric combat as a socially contingent, embodied practice.

Doman, Jessamy [146] see Coutros, Peter

Dombrosky, Jonathan (Department of Anthropology, University of New Mexico), Emily Lena Jones (Department of Anthropology, University of New Mexico) and Seth Newsome (Department of Biology, University of New Mexico)

[340] *Raptor Management and Whistle/Flute Production in Pueblo IV New Mexico*

The Pueblo IV period (ca. AD 1300–1600) in New Mexico was a time of great societal change, and the religious significance of birds is thought to have flourished during this time period. In particular, whistles and flutes, commonly made from the ulnae of birds of prey, become ubiquitous in the Pueblo IV Middle and Northern Rio Grande. The importance of birds to Puebloan society has been well-documented ethnographically: raptors (primarily eagles) held captive by modern Puebloan groups are sometimes sacrificed, a religiously significant act. However, little has been done to connect Pueblo IV archaeological whistles/flutes with the ethnographically documented practices of capture and sacrifice. Were raptors whose bones were made into whistles and flutes managed in captivity? How exactly does the functional role of captive raptors extend beyond their sacrifice? In this paper we explore these questions through measurement of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of whistles and flutes recovered from Pottery Mound (LA 416) and Sapawe'uinge (LA 306), two sites in the Middle and Northern Rio Grande from the Pueblo IV Period.

Dombrosky, Jonathan [251] see Steele, Laura

Domeischel, Jenna (Eastern New Mexico University)

[315] *Moderator*

Domenici, Davide (University of Bologna, Italy)

[392] *Colorful Material Connections: Noninvasive Analyses of Mesoamerican Pictorial Manuscripts and Their Cultural-Historical Implications*
Noninvasive scientific analyses recently performed by the "MOLAB" mobile laboratory on a number of prehispanic and early colonial pictorial manuscripts provided a host of new data that deepen our knowledge of Mesoamerican coloring materials and painting practices. The huge corpus of available analytical data—obtained from codices Madrid, Cospi, Borgia, Vatican B, Laud, Fejérváry-Mayer, Nuttall, Bodley, Selden, Selden Roll, Tudela, Vatican A, and Mendoza—allows the first cultural-historical interpretive effort aimed at identifying different technological traditions and at evaluating how they match with established stylistic and thematic classifications, as well as their relations with other coloring traditions such as mural painting or textile dyeing. The comparison of manuscripts from different regions and epochs also provides interesting hints on topics such as cross-cultural interactions among prehispanic Mesoamerican painters/scribes, the emic perception of the materiality of color, and the technological changes introduced in early colonial times.

Domenici, Davide [283] see Valesse, Immacolata

Domett, Kate [276] see Newton, Jennifer

Domingo, Ines [28] see Smith, Claire

Domínguez, María del (Universidad Autónoma de Campeche), Yolanda Espinosa Morales (Universidad Autónoma de Campeche), Javier Reyes Trujeque (Universidad Autónoma de Campeche), Francisca Zalaquett Rock (Universidad Nacional Autónoma de México) and William Joseph Folan (Universidad Autónoma de Campeche)

[349] *Los instrumentos musicales de la Estructura II y III de Calakmul, Campeche: Caracterización fisicoquímica e interpretación cultural*
Estudios recientes derivados de la caracterización de instrumentos musicales de Calakmul, Campeche, México, procedentes de las Estructuras II y III, han revelado importante información respecto a la relación que mantuvo Calakmul con ciertas tradiciones, más que alfareras desde el punto de vista estilístico con otras entidades políticas mayas. Es visible la presencia, en algunos instrumentos musicales, de rasgos y atributos procedentes de otras regiones mayas que nos hacen pensar en el indudable vínculo que Calakmul mantuvo con diversos sitios a través de relaciones políticas y diplomáticas, principalmente para el Clásico Tardío y Terminal. Un mapeo de estas tradiciones de los instrumentos musicales solo es posible a través de la caracterización fisicoquímica de los mismos, mediante diferentes técnicas analíticas como la difracción de rayos X, fluorescencia de rayos X y FITR.

Dominguez, Nancy (Dirección de Registro Público de Monumentos y Zonas Arqueológicas e Históricas)

[328] *The Importance of Updating Information: The "Proyecto de Actualización y Digitalización de las Cédulas del Registro Público"*
In 2010 the "Sistema Único de Registro de Monumentos y Zonas Arqueológicas e Históricas" was developed to face the need of having a modern and strong technological support capable to cover the legal, academic and institutional aspects that the Public Registry required as a fundamental area of the Institution. It has the duty to guarantee information for query and monitoring activities about federal and particular monuments involved in the system. Due to the vast universe of information which have been gathered by INAH from its foundation in 1939, to our days, and after the Federal Supreme Audit, the government seeks to incorporate the accumulated data of movable goods to "Sistema Único de Registro Público de Monumentos y Zonas Arqueológicas e Históricas" before its creation with the purpose of standardizing all records, updating the information, safekeeping and location, as well the verification of the collections. In this paper, I'll present the guidelines, procedures and preliminary results of "Proyecto de Actualización y Digitalización de las Cédulas del Registro Público," stressing the importance of this contribution in our workplace.

[328] *Chair*

Dominguez C., Maria del Rosario [217] see Folan, William J.

Dominguez-Bella, Salvador [23] see Querré, Guirec

Dominguez-Rodrigo, Manuel [305] see Mercader Florin, Julio

Donahue, Randolph (University of Bradford), Adrian Evans (University of Bradford), Antony Dickson (Oxford Archaeology North), Anne Clarke (Oxford Archaeology North) and Fraser Brown (Oxford Archaeology North)

[100] *Integrating Lithic Microwear and Sourcing to Improve Understanding of Socioeconomic Behavior in the British Mesolithic*
We present the results of an integrated study of lithic microwear analysis and lithic sourcing at the large Mesolithic site of Stainton West. Microwear analysis helped to understand why the site was so large and how the occupants supported themselves while at the site. Microwear analysis of 700 artifacts led to 49% identification of use. There is much diversity in tool use: hide working, butchery (meat/fish), impact, antler/bone working, wood working, and plant working. Various patterns were detected between tool use and tool technology. Many of the numerous microliths, showed impact damage, but are attributed to fishing rather than hunting. This conforms to the riverside location of the site on the River Eden. Hide working was primarily limited to dry hide, which supports the hypothesis that hunting was not the primary procurement activity and is also suggestive of a residential site, which is further supported by the diverse set of tools and wide range of activities represented. The sourcing study shows that raw material was procured from long distances in all directions. We conclude that the site was likely an aggregation site where many bands came together to exploit an abundant but temporary fish resource.

[100] *Chair*

Dong, Guanghui [78] see Zhang, Dongju

Dong, XinLin (Institute of Archaeology, CASS, China.) and Wang Ying (Institute of Archaeology, CASS, China.)

[25] *New Research and Understandings at the Royal City of the Liao Supreme Capital Site*

The Liao Supreme Capital site is located in Lindong, Balinzuoqi, Inner Mongolia. It contains the Royal City in its north and the "Han" City in its south, with a total area of five squared km. To preserve and better understand the Supreme Capital's layout and evolution, Team Two of the Chinese Academy of Social Sciences Institute of Archaeological Research joined with the Inner Mongolia Institute of Archaeological Research to form the Liao Supreme

Capital Archaeological Team, which conducted full coverage surveying, augering, and systematic excavations at the site from 2011–2015. The Team surveyed and augered a three square km area of the Royal City. Excavations were conducted on the Royal City's wall and its east and west gates, on the Buddhist temple site on the Royal City's western edge, on roads and their adjacent architecture in the southern part of the Royal City, on the Palace City's wall and east and west gates, and on the Palace City Hall Number 1. These investigations at the Supreme Capital resulted in foundational information on Liao Dynasty capital city archaeology, raised the level of research on the Supreme Capital's layout and evolution, and greatly promoted archaeological and historical research on Liao Dynasty capital cities.

Dongoske, Kurt E. (Zuni Cultural Resource Enterprise)
[255] *Discussant*

Dongoske, Kurt E. [394] see Anschuetz, Kurt F.

Donner, Kristin [132] see Cerccone, Ashley

Donner, Natalia (Leiden University), Alejandro Arteaga Saucedo (Universidad Nacional Autónoma de México), Kaz van Dijk (Leiden University) and Alexander Geurds (Leiden University, University of Oxford)
[179] *What Do We Talk About When We Talk About Precolonial Sites in Chontales, Central Nicaragua?*

The Proyecto Arqueológico Centro de Nicaragua (PACEN), directed by Alexander Geurds, has recently conducted archaeological research in Chontales, Central Nicaragua. The main focuses of the study include the identification of the different types of settlements, understanding site and mound morphologies, as well as redefining the regional pottery sequence. Therefore, the authors of this paper carried out a systematic full-coverage high intensity survey of a 52 km² area, a complete mapping of the 46 mounded sites found, as well as stratigraphic excavations to diachronically and synchronically interrelate the different settlements. In this paper, we discuss the various distinctive traits that conform precolonial sites in Central Nicaragua, looking at archaeological remains, environment, and geomorphology as inherently interconnected analytical elements. Settlements are discussed as an intertwined combination of specific soil types, hydrology and landscape features, as well as particular architectural features and material culture. The analysis of the different sets of combinations of all these characteristics, which conform the quintessential ontology of the sites, will shed light on how we can define prehispanic settlements in the research area.

Dooley, William [345] see Todd, Lawrence

Doolittle, William (University of Texas)
[84] *Dirt, Rocks, and Water: Irrigation Here, There, Then, and Now*

Regional specialists spend most of their time studying many topics in one area. Indeed, it would be next to impossible to be an authority on a region and its complexities if one did otherwise. Topical specialists, travel widely and study numerous variations on a single theme. Each of these specializations has its pros and cons. Neither is superior to the other. They are complementary. This presentation focuses on ancient irrigation in the American Southwest and present-day parallels from other parts of the world. Similarities are striking, as are differences.

Doonan, R.C.P. [4] see Thompson, Lenore

Dorison, Antoine [340] see Manin, Aurelie

Doroszenko, Dena (Ontario Heritage Trust)
[348] *Pills and Potions at the Niagara Apothecary*

In 1964, pharmacist E. W. Field, closed his practice in Niagara-on-the-Lake due to ill health. This pharmacy had been in operation for a total of 156 years by 6 pharmacists, 5 of whom had been apprenticed to their predecessors. Reopened in 1971 as an authentic restoration of an 1866 pharmacy, the building is owned by the Ontario Heritage Trust and curated by the Ontario College of Pharmacists. Several archaeological investigations have taken place in the rear yard of the apothecary, most recently in 2016 with further work planned in 2017. The excavation of a large pit feature recovered hundreds of pharmaceutical bottles dating from the late 1800s to the early 1900s. This assemblage allows for discussion on the role of the pharmacist in a small community as well as allowing observations to be made regarding the community's behavior and social needs with this service over time particularly in response to disease. The local apothecary was part of an old tradition, that of being a medical advisor and this site has a wealth of historical records and archaeological data to review developments in the context of broader topics of health, disease and medicine in small town Ontario.

Dorshow, Wetherbee (University of New Mexico)

[130] *Toward a Dynamic Geospatial Model of Shifting Hydrologic Regimes and Agricultural Potential at Chaco Canyon: Report from the Field*
 This paper summarizes objectives, strategies and preliminary findings of ongoing research at Chaco Canyon led by the University of New Mexico and the Puente Institute, and funded by the National Science Foundation. The paper focuses on the use of advanced geospatial technologies for field data collection, analysis, and visualization. Project datasets to be discussed include airborne and terrestrial lidar, stereo panoramic photogrammetry, kite/balloon mapping, GIS-based full-motion video, ground-penetrating radar, hyperspectral and multispectral imaging. The paper also will touch on advanced data access and visualization through a range of 2D, 3D and augmented reality apps and tools.

Dorwin, John T
[250] *Remote Sensing at 45PO435, the South Flying Goose Site*

In the summer of 2014, during the course of National Register evaluation of 45PO435, a site on the Kalispel Indian Reservation along the Pend Oreille River in the mountains of eastern Washington, an isolated small burned structure was located by means of magnetometry and ground-penetrating radar. Its existence was confirmed by means of soil augering. Its dimensions were delineated by a combination of augering, excavation and electrical resistance. This paper discusses the contributions made by each of these techniques to create a stronger picture of the whole. Functionality, ethnobotany and geoarchaeology of the structure were explored by Molly Carney.

[250] *Chair*

Dosseto, Tony [333] see Marwick, Ben

Dotzel, Krista [262] see Singer, Zachary

Doucette, Dianna (Public Archaeology Laboratory [PAL])

[16] *Style versus Occupation II: A Broader View of the Narrow Stemmed Tradition in Southern New England*

Artifact types are often used as markers of social boundedness or "ethnicity" although the relationship between typology and culture remains a very complex and poorly understood issue. Projectile points from the Narrow-stemmed Tradition (also called the Small Stemmed Tradition) are ubiquitous in southern New England and can rarely be attributed to a single component Native American archaeological site. Attempts have been made to seriate this style of point with varying success, given its style is one that would have been expediently made from local quartz cobbles and convenient enough to transcend across millennia. Typically assigned to the Late Archaic period (ca. 6000 to 3000 BP), the style is often recovered along with components of the Early Woodland period (ca. 3000 to 2000 BP). This paper expands upon a poster presented in 2011 on the analysis of Narrow Stemmed points from one site in eastern Connecticut. Recent excavations at the several other sites in eastern Connecticut and southeastern Massachusetts by PAL yielded large assemblages of Narrow-stemmed points, some in association with radiocarbon dated features, permitting an opportunity to compare and reassess the artifact typologies, cultural chronologies, and models of social organization southeastern New England.

Dougan, Sarah [46] see Muir, Robert

Douglas, Joseph (Volunteer State Community College)

[68] *Marking the (Under) Ground: Civil War Soldier Graffiti in the Mammoth Cave Region of Kentucky*

During the American Civil War, numerous Union and Confederate soldiers visited dozens of caves in the major karst areas of the border and Confederate states, often marking the subterranean walls with graffiti. In the most important karst area of all, the Mammoth Cave region of Kentucky, caves were significant (and famous) features of the landscape, possession of which was bitterly contested, especially in the military campaigns of 1862. A preliminary study of extant historic graffiti at several Kentucky cave sites including Diamond Cave, Mammoth Cave, and others shows that men in the Union and Confederate armies did not just visit caves throughout the region, but they also claimed the underground spaces with their graffiti as part of the struggle for physical and political control of Kentucky. Rival soldiers also had much in common; their cultural conceptions of caves were mostly the same, and many of them had been transformed as they left behind their civilian lives and embraced new identities as soldiers.

Douglas, Allison [394] see Dudley, Meghan

Douglass, Kristina (Smithsonian National Museum of Natural History)

[32] *The Anthropocene of Madagascar: Reviewing Chronological Evidence for Madagascar's Colonization*

The date of Madagascar's initial settlement has long been the subject of academic inquiry and debate. Archaeologists, historians, geneticists, linguists and paleoecologists interested in the history of Malagasy and Indian Ocean peoples, regional exchange, and environmental change have contributed diverse datasets and perspectives to this debate over Madagascar's colonization, but consensus on the timing of human arrival remains elusive. Despite its relative proximity to the African mainland, Madagascar was thought to have been settled around 1500 BP by iron-using agriculturalists from SE Asia. Recent archaeological findings, however, suggest that foraging groups reached the island by as early as ca. 4000 BP, if not earlier. Such early dates for Madagascar force us to reconsider models of the island's colonization, particularly in terms of the nature and rate of anthropogenic impact on its biotic communities. In this paper we review chronological evidence for the settlement of Madagascar, applying standards of chronometric hygiene that have been used to refine the settlement histories of islands in the Caribbean and Pacific. This review allows us to more productively compare the colonization of Madagascar to other island colonization scenarios around the world.

[32] *Chair*

Douglass, Matthew [38] see Braun, David R.

Doumani, Paula [290] see Hermes, Taylor

Dowd, Anne S. (ArchæoLOGIC USA, LLC)

[216] *Traditional Native American Raw Material Sources in the Yellowstone Region*

Obsidian and other lithic sources in the Yellowstone region of Wyoming and nearby Montana or Idaho were used up until contact with Euroamericans and information from oral traditions, ethnohistory, ethnoarchaeology, and toponymy provide data on the significance of certain raw material choices made by Native Americans such as the local Shoshone. Why did chipped stone weapons and tools persist even after new metal technologies were introduced? How did the choices of raw materials signal Native resistance to colonizing and settlement challenges posed by newcomers to the region? In what ways did the lithic raw material sources contribute to the formation of a set of quarry landscapes with symbolic associations meaningful within a broader cosmological worldview or social milieu? Were extraction locales perceived to have their own sacred power, potentially becoming traditional cultural properties? These themes are addressed from the standpoint of an anthropology of technology and a landscape archaeology approach.

Dowkes, Shalcey (University of Calgary) and Margaret Patton (University of Calgary)

[344] *Microwear on Shell Beads at Cluny Fortified Village (EePf-1)*

Beads in many forms have been used as decorative items on the Great Plains during the historic and prehistoric periods. Cluny Fortified Village (EePf-1), dating just prior to European contact, is an intrusive village unique on the Northwestern Plains. The unique artifact assemblage at the site offers information on the understudied topic of prehistoric shell bead production on the Northern Plains using local bivalves. During the past ten years, a number of shell beads, shell bead blanks, and waste materials have been recovered during excavation. Research elsewhere on bead production has suggested the use of drills to form the hole of the bead. However, at EePf-1 there are relatively few lithic drills despite the amount of shell beads uncovered. As shell is a relatively soft material, several materials are considered for use as drills including bone, wood, and lithic tools. Analysis of shell beads from the site indicates a variety of bead types and provides evidence connecting potential drill materials to bead production. Microwear analysis of

finished and partially finished beads provides details on drilling methods and evidence of drill material. Microwear on suspected drills from the site also indicates whether or not these tools were used in bead production.

Downes, Jane (University of the Highlands and Islands) and Ingrid Mainland (University of the Highlands and Islands)

[124] *Coastal Erosion as an Arena for Change*

The problem facing archaeological heritage through loss and damage caused by rising sea levels and increased storminess requires responses that are multifaceted and creative. Sufficient resources to deal with exposed archaeological sites and deposits through established 'preservation by record' methodologies are not available anywhere. In the Scottish archipelago of Orkney the combination of sand and low lying shores and extremely rich archaeological heritage make the problems of coastal erosion particularly acute. Multi-period sites are cut through by erosion, revealing sections through buildings and middens representing "deep time," as frequently 5,000 years of occupation are visible. This paper describes a multidisciplinary and participatory approach to developing an understanding of the coastal erosion of archaeological heritage within wider contexts of debate around climate change and sustainability. The potential of creative and educative "uses" of the eroding coastal archaeological resource, are seen as complementary to the sites' value as "distributed observing networks of the past." The application of this approach is discussed using case studies from Orkney, and from Rapa Nui.

Downey, Jordan, Oliver Hegge, Kari Lentz and Steven A. Wernke (Vanderbilt University)

[75] *Photogrammetry All the Way Down: Multi-Scalar and Multiplatform Photogrammetry as Primary Spatial Registry in a Large Excavation Project*

In 2016, a large excavation project was carried out at the site of Mawchu Llaqta in the Colca Valley of southern Peru. A colonial reducción (planned town), Mawchu Llaqta is a large site with plazas, chapels, a parish, and domestic compounds. These spaces all consist of complex standing architecture in varying degrees of preservation. Eleven excavation blocks were opened to better understand ritual and everyday life in the town. The extent and distribution of the excavations, however, presented the significant challenge of how to document large-scale, multi-team excavations dispersed around the site. We present a photogrammetry-centered solution, focusing on an integrated workflow for multi-scalar and multi-platform photogrammetry, from UAS-based documentation of the whole site, to detailed recording of excavations. All excavation blocks were serially documented using photogrammetry to create high-precision 3D models of the entire process, starting from the surface and continuing all the way down through the end of excavations. These models were integrated with an RTK GNSS mapping system for plotting ground control points, individual contexts, and individual artifacts. In this paper we demonstrate our workflow with specific examples at each scale and distinct contexts. Finally, we offer suggestions for other archaeologists interested in implementing these methods.

Downey, Caitlin (Washington State University), Sydney Hanson (Washington State University), Molly Carney (Washington State University) and Jade d'Alpoim Guedes (Washington State University)

[260] *Paleoethnobotany in Undergraduate Research*

I have spent the last year gaining laboratory experience in the Paleoethnobotany laboratory at Washington State University. My purpose in the lab was to aid two graduate students with their master's thesis research. Thus far, I have learned the basics of paleoethnobotanical analysis through examining material from both the Old World (Thailand) and the New World (the Pacific Northwest). These basics include how to identify different types of seed and wood charcoal, how to properly organize and label samples, and how to properly enter data for later quantification. Here, I propose how I will apply these skills to my future research. Additionally, I will discuss the importance of undergraduate research and laboratory experience in archaeology.

Downey, Nathan (University of Chicago), Alan Farahani (Cotsen Institute of Archaeology, UCLA) and Stephen Acabado (Department of Anthropology, UCLA)

[229] *An Examination of Anthropogenic Burning in Old Kiyangan Village, Ifugao*

The rapid expansion of the Old Kiyangan Village (OKV) in Ifugao, Philippines was accompanied by population increase and a shift in crop production—from taro to wet-rice. Archaeological excavations at OKV have also uncovered larger-than-expected quantities of wood charcoal that likely represent burning episodes associated with this shift. Preliminary analysis of the distribution of wood charcoal indicates that specific locations within the OKV were for anthropogenic burning practices. Moreover, initial taxonomic identification of the charcoal includes one member of the Cordillera Pine species (*Pinus kesiya* Royle ex Gordon), possibly used as kindling. Currently, the forests surrounding the OKV do not sustain large populations of *P. kesiya*. Through the careful integration of ethnohistoric evidence of tree cutting and burning practices in Ifugao alongside the examination of charcoal recovered from OKV, this paper investigates the historical anthropogenic burning practices of the Ifugao and provides preliminary results from the paleoethnobotanical investigation of the OKV. Finally, the paper also illustrates how seemingly "inaccessible" or "remote" kinds of archaeological data such as wood charcoal can be used to illustrate cultural practices that have meaning both in the past and present.

Downey, Sean and Randy Haas (University of Wyoming)

[227] *Early Warning Signals of Demographic Collapse Detected in a Meta-Database of European Neolithic Radiocarbon Dates*

This study uses statistical tests known as "early warning signals" (EWS) to determine whether declining socio-ecological resilience presaged a pattern of collapse during the Early Neolithic Period in Europe. Our earlier research has shown with a high degree of certainty that radiocarbon-inferred human demography during the Neolithic exhibits a boom-and-bust pattern. In this new study we analyze our meta-database of radiocarbon dates in order to determine whether societies on the verge of major reorganization—regime shift—may exhibit declining resilience, and if it can be detected using statistical methods. In seven of nine regional datasets we find increasing autocorrelation and variance leading up to collapse, suggesting that these societies began to recover from perturbation more slowly as resilience declined. We use simulation to validate our methods and show that sampling biases, atmospheric effects, radiocarbon calibration error, and taphonomic processes are unlikely to explain the observed EWS patterns. While EWS have been detected in biology and ecology, to our knowledge, this study is the first to find early warning signals of demographic regime shift among human populations.

Downs, Lauren (AECOM), Sandra Pentney (Atkins), Marla Mealey (California State Parks), Nicole Turner (California State Parks) and Natalie Brodie (LSA Associates)

[300] *Climate Change Risk Assessment of Coastal Archaeological Resources in San Diego County*

Climate change poses threats to both inland and coastal archaeological resources alike. Sites along the coast of San Diego County are under various threats such as inundation and erosion due to sea level rise. For over two years, the Society for California Archaeology (SCA) and the San Diego County Archaeological Society (SDCAS) have been directing the Climate Change Project to assess the effects of climate change on San Diego County resources. This study utilizes GIS analysis to examine coastal sites recorded by the Climate Change Project and compares those data with elevation and erosion models to create a risk map of the San Diego coastline. This map can then be used by agencies such as California State Parks when deciding where to concentrate preservation efforts.

Downum, Christopher [155] see Pawlowicz, Leszek

Doyel, David (Arizona State Museum)

[84] *Vision and Action: Suzanne Fish and Paul Fish and the Hohokam World*

Throughout their careers, Paul Fish and Suzanne Fish cast a wide net in their studies of the American Southwest, and the Hohokam region of southern Arizona in particular. This powerhouse duo vigorously applied their intellectual breadth and energy throughout their long productive careers to ferret out the complexities of the ancient past. Their team approach and complementary skill sets include regional archaeology; method and theory; settlement structure and social organization; field survey and excavation; ethnography; analysis; synthesis; and more, coupled with an enviable publication record. Then there are their lifetimes of teaching, directing field schools, and their many students. They had great vision and problem solving skills, and they knew how to translate their vision into action. Their work has left a permanent mark on how we study the Hohokam. And, of course, they aren't done yet. This paper provides an overview of their productive careers with a focus on the Hohokam region of the Southwest.

Doyle, Colin [83] see Beach, Timothy

Drake, Lee (University of New Mexico)

[130] *Chemostratigraphic Analysis of Alluvial Sediments in Chaco Canyon, New Mexico*

Complex societies are generally dependent on agrarian economies whose success is contingent on water and nutrient availability. For Chaco Canyon, an Ancestral Pueblo cultural center in northwestern New Mexico with monumental construction dating from the ninth to twelfth centuries AD, the role of local agriculture has been of particular interest. Here, data are presented from three summers of fieldwork using X-ray fluorescence to identify the geochemical composition of sediments, with a focus on those elements relevant to agriculture (Potassium, Phosphorous, and Sulfur), indicators that can indicate evaporation as a proxy for hydrology (Calcium/Strontium ratio), and indicators of changing sedimentation sources (Titanium, Rubidium). Data was collected nondestructively along multiple exposed sections of the arroyo in 2–5 cm increments, allowing for a time series analysis to show changing patterns in all of the aforementioned elements during sediment deposition in the canyon.

Drake, Stacy [83] see Locker, Angelina

Drapela, Tomas [131] see Lieskovsky, Tibor

Dresser-Kluchman, Elizabeth (Barnard College)

[192] *Scarred Ponderosas, Rock Art, and Other Traces of Ute History: New Evidence from the Rio Grande Del Norte National Monument*

This poster reports on an archaeological survey in the Rio Grande Del Norte National Monument that has revealed important new evidence of the Ute and other hunter-gatherers dating to the late precolonial and early colonial periods. Of particular interest are a series of culturally modified Ponderosa pine trees, which are likely linked to Ute foodways employed during period of starvation or want. I examine these culturally modified trees as artifacts on the landscape within the context of the wider archaeological evidence in the survey. This evidence includes an especially notable concentration of rock art that contributes to the understanding of Ute iconography in the region, as well as other traces of hunter-gatherer life.

Drine, Ali [240] see Braekmans, Dennis

Driver, Jonathan (Simon Fraser University)

[85] *Discussant*

Druc, Isabelle (University of Wisconsin-Madison), Roberto Pimentel Nita (University of Warsaw, Poland), Maciej Kalaska (University of Warsaw, Poland), Rafal Siuda (University of Warsaw, Poland) and Marcin Syczewski (University of Warsaw, Poland)

[316] *Ceramic Production for Castillo de Huarmey, Peru: Multiple Productions and Buzzing Potters*

The paste analysis of the ceramics found in the Castillo de Huarmey, a Middle Horizon Wari political center on the north coast of Peru brought forth the existence of a variety of production areas and a panorama of multiple producers with different agendas or practices. Much of the ceramics appear to have been made with material available in the Huarmey lower valley, coastal area, and probably the adjacent Culebras Valley. The fine painted Wari ceramics and fine reduced impressed wares present a degree of manufacture denoting care in material selection, granulometry control and firing, with homogeneity in paste composition and technology. Mold impressed wares were more rapidly made, with variability in material provenance, composition and sorting. Communities of potters sharing the same technological tradition (and types of molds) must have been working close to the coast and in the lower to mid-valley. Upper valley producers probably contributed much less if at all to the distribution network feeding the Huarmey community.

Drucker, Dorothée [143] see Haller Von Hallerstein, Sophia

Dubois, Justin [264] see Kay, Marvin

Dubyagina, Ekaterina [290] see Hermes, Taylor

Dudar, Chris (Smithsonian Institution)

[63] *Discussant*

Dudgeon, John [123] see Franklin, Olivia

Dudgeon, John (Idaho State University—CAMAS)**[123]** *Molecular Taphonomy of Biominerals in the Western Pacific*

Molecular and microarchaeological artifacts of human subsistence are recorded in the bones, tissues and residues of the skeleton. These artifacts provide substantial correlative evidence for macroscopic and sedimentary data of dietary plant and animal use in the archaeological record. Within the depositional context however, many factors in the local environment disturb or degrade these signatures, reducing or eliminating their usefulness in diet reconstruction. The islands of the tropical Western Pacific produce local environmental conditions that can be particularly disruptive to biogenic signatures, and methods to assess diagenetic alteration are prudent, given the destructive and costly nature of these analyses. Here, we present data collected using ATR-FTIR on Western Pacific specimens submitted for dietary and molecular analysis, and compare our indices of preservation with local environments, chronologies, and dietary and molecular data survival. This is used to create a fine-scale inferential model for assessing the likelihood of extracting dietary data in these environments.

[123] *Chair*

Dudin, Alexander [223] see Pryor, Alexander

Dudley, Meghan (University of Oklahoma)**[394]** *"Come Together, Right Now": The Oklahoma Public Archaeology Network and Its Role in Oklahoma Public Archaeology*

Like many other states, Oklahoma has a long history of productive public archaeology, with citizen and professional stakeholders working side-by-side to further archaeological research and preservation. However, the changing nature of archaeology (most particularly the shift to a heavy emphasis on compliance work) has led to miscommunication and misunderstanding among the many stakeholders in Oklahoma's archaeological community and to less-productive working relationship among them than existed several decades ago. Yet opportunities for citizen-archaeologist collaboration still abound, and with this in mind we founded the Oklahoma Public Archaeology Network (OKPAN). OKPAN facilitates dialogue among stakeholders and creates new opportunities for Oklahoma citizens, including members of the state's many indigenous nations and avocational archaeologists to engage together in the study and stewardship of the past. In its first year, OKPAN sponsored several major statewide initiatives, the goals and results of which we discuss in our presentation.

[291] *Discussant***Duelks, Jonathan (University of British Columbia), Jacob Jones (University of British Columbia), Steve Mozarowski (University of Toronto), John Maxwell (Ethos Archaeology) and Bryn Letham (University of British Columbia)****[49]** *A Post-Glacial Relative Sea Level Curve and Paleoshoreline Archaeological Survey for the Prince Rupert Harbour, BC, Canada*

We present a relative sea level (RSL) curve for the Prince Rupert Harbour area for the last 15,000 years that is based on nearly 150 radiocarbon-dated data points. RSL dropped from at least 50 masl to several m below current sea level immediately after deglaciation, before rising again to 4–6 m asl during the early Holocene. By 6,000 years ago RSL had approached its current position, though there have been some late Holocene fluctuations. We used this RSL history in conjunction with lidar-derived bare earth models to design and conduct an archaeological survey that targeted ideal landforms on paleoshorelines associated with the early Holocene high stand. We report on several archaeological sites that we found during this survey that date between 6500 and 9500 cal. BP, the oldest archaeological material currently recorded in the Prince Rupert Harbour. In addition, we highlight some other aspects of paleoenvironmental reconstruction for the region based on analyses of diatoms, charcoal, and other sediment characteristics in lake cores. Our research demonstrates the utility of a detailed understanding of RSL history and high resolution lidar digital elevation models for designing predictive models for surveying for early Holocene archaeological sites on coastal landscapes.

Duelks, Jonathan [257] see Anderson, Shelby

Dueppen, Stephen (University of Oregon) and Daphne Gallagher (University of Oregon)**[161]** *Remodel, Rebuild, or Abandon? Changing Uses of Space in an Early West African Village*

Ancient villages in western Burkina Faso were long-lived communities, temporally rooted in deep social histories experienced in the built environment and local geography. The site of Kirikongo, continuously inhabited from ca. 100 CE to 1700 CE, and composed of 13 separate tells (mounds), exemplifies these spatio-temporal dynamics, as over time the economic and social characters of tells, and their spatial positioning and characteristics changed dramatically despite maintenance of certain spatial and temporal referents. In this paper, we discuss how historical dialogues with space, place and materials shaped different phases in the site's occupation. These relations and referents are at the core of changing identities from individuals to house and community. We explore how events and processes were significantly shaped by prior spatial and material choices as certain spaces maintained significant continuity for social roles, while others reflect the rejection of certain histories, through either abandonment and decay or through an active construction atop and physical alteration of the former space.

Duff, Andrew (Washington State University), Judith Habicht-Mauche (University of California, Santa Cruz) and Rob Franks (University of California, Santa Cruz)**[155]** *Glaze-Paint Pigmenting Strategies in the Upper Little Colorado and Western Zuni Regions of the American Southwest*

LA-ICP-MS is used to examine glaze-paint pigmenting strategies during the Pueblo IV period in the Upper Little Colorado and Western Zuni Regions of the American Southwest. These data are integrated with INAA sourcing information and compared to glaze-paint strategies from other areas of the late precontact Southwest to define cross-cutting technological communities of practice and to trace the circulation of ideas, production techniques, raw materials and finished objects through networks of social interaction and shared practices at village, intraregional and interregional scales. These results contribute to the increasingly macro-regional exploration of how social networks facilitated the exchange of technical information, fostered migration, and served as arenas of social reproduction that transformed late precontact period social groups in the American Southwest.

Duffield, Seonaid [49] see McLaren, Duncan

Duffield, Seonaid (University of Victoria), Duncan McLaren (University of Victoria) and Iain McKechnie (University of Victoria)**[49]** *Archaeological and Architectural Considerations of Intertidal Shellfish Use and Deposition on Hecate Island, Central Coast of British Columbia*

Detailed tracking of the chronology and spatial extent of shell middens on the Northwest Coast is a challenging and often expensive proposition given the size and time depth often represented at these sites. The Hakai Ancient Landscapes Archaeology Project (HALAP) used vibracore technology to efficiently sample intact 7 cm diameter stratigraphic profiles from multiple 4–6 m deep shell midden deposits at site EjTa-13 on Hecate Island. A series of radiocarbon dates from the initial core documents a continuum of site occupation ranging from 5000 to 1200 years cal BP. Faunal remains and artifacts from subsequent samples provide highly resolved records of coastal resource use, including the use of shell for personal adornment. Significantly, the purposeful terraforming of massive amounts of shell likely harvested from the broad intertidal zone fronting the site provides an engineered and well-drained foundation for the site. A major feature of this site is that the shoreward portion appears to have been eroded considerably from its former extent indicating that when occupied, the site physically expanded the terrestrial shoreline above high tide mark.

Duffy, Paul R. (University of Toronto)

[196] *Gone to Pot: Stylistic Breaks in a Radiocarbon-Based Ceramic Chronology for the Eastern Hungarian Bronze Age*

The Great Hungarian Plain is densely populated with fortified tell sites dating to the second millennium BC. At the end of the Middle Bronze Age (c. 1400 BC), however, these settlements were abandoned. Traditionally, archaeologists argued that locals were run off by invading Tumulus culture groups or suffered an environmental disaster. The lack of non-tell contexts and radiocarbon dates bridging this transition precluded an understanding of what changed after the tells were abandoned, and what marked the beginning of the Late Bronze Age. We address this discontinuity with a recently well-dated cremation urn cemetery in the eastern Great Hungarian Plain bridging the three traditional sub-phases of the Bronze Age (Early, Middle and Late). We use changes and continuities in ceramic form and style to measure points of continuity and discontinuity in the material culture during the use life of the cemetery. We provide evidence that although ceramic style changes do occur during the Bronze Age, the overall pattern is one of continuity rather than regional abandonment, with use of the cemetery continuing after 1400 BC when the tell sites go into disuse.

[196] *Chair*

Duffy, Paul R. [196] see Barlow, Robert

Dufour, Elise (Muséum national d'Histoire naturelle)

[238] *Geographic Origin of Sacrificed Camelids at Huanchaquito (Chimú Period, Northern Coast of Peru): Insight from Stable Isotopic Analysis*

Excavations at the Chimú site of Huanchaquito located in the Moche Valley (northern coast of Peru) led to the discovery of an exceptional sacrificial deposit of more than 200 domestic camelid skeletons. This finding adds to the many testimonies of the presence of camelids on the Peruvian coast during the prehispanic era. The abundant presence of animals suggests—but does not bring definitive evidence—that breeding took place locally in an unfavorable arid environment. Measurements of stable isotopes of carbon, nitrogen and oxygen and radiogenic isotopes of strontium in archaeological remains are a primary source of information on the life history of past humans and animals. Isotopic analysis was used to address the question of the geographic origin and movements of Huanchaquito animals among the different ecological zones of the Andes. Both organic tissues (bone collagen and hair) and hard tissues (bone apatite and enamel) are well preserved at Huanchaquito. The combined isotopic analysis of these tissues allow for the reconstruction of diachronic life history of camelids. Comparison with isotopic data for other cultures and valleys supports the existence herding practices specific to prehispanic times in northern Peru.

[238] *Chair*

Duggan, Ana T. [144] see Harris, Alison J T

Dugmore, Andrew (University of Edinburgh), Jette Arneborg (National Museum of Denmark), Christian K. Madsen (National Museum of Denmark), Thomas H. McGovern (Hunter College, City University of New York) and Rowan Jackson (University of Edinburgh)

[32] *Exploring the Limits of the Island Anthropocene: the Norse Colonization of Greenland in an Atlantic Context*

The medieval Norse colonization of Greenland was unique, but we can use this completed experiment to explore key drivers of, and limits to, the “island Anthropocene.” The indigenous biota of Greenland while sensitive, lacks the fragility of small, isolated low latitude oceanic islands rich in endemic species. The timing of Norse settlement was determined by the patterns and process of island colonization to the east combined with a suitable environmental and economic window of opportunity. The timing and scale of settlement was contingent- and the consequences were different to previous Norse island colonizations to the east. In Greenland Norse settlement was limited to pockets of the west coast where the settlers either lacked the numbers or the means to impose rapid or lasting environmental transformations—or they were inhibited by their approach to environmental management. Much of the Norse impact on Greenland was transitory as species they introduced were dependent on people and disappeared with them. Key drivers of exploration, colonization and settlement were honor and prestige, and the ways of achieving this through control of land or trade items; environment and distance strongly mediated the process, with transitions to alternate states strongly determined by the numbers of people.

[148] *Discussant*

Duin, Renzo [384] see Siegel, Peter E.

Duke, C. Trevor (University of Florida) and Martin Menz (University of Michigan)

[241] *Economic Intensification and Social Differentiation: A View from the Late Woodland Southeast*

Intensification has long been equated with the rise of tightly-controlled economies, often in association with incipient social inequality. Previous research has sometimes suggested that centralized control is necessary both for the development of intensification as a viable economic strategy, and for the management of its repercussions. Here, we present evidence from Kolomoki, Crystal River, and Roberts Island, three prominent Late Woodland (ca. AD 500–1000) mound centers of the American Southeast, to demonstrate that economic intensification existed on a broad scale, and grew out of the social practices of communities lacking apparent social hierarchy. Specifically, we evaluate these phenomena by comparing trends between inland domestic economies and coastal subsistence economies. Our evidence suggests that different social groups within some Late Woodland communities were associated with intensification of particular resources. In our view, these trends highlight striking similarities in the development of economic and social differentiation during this period across a broad swathe of the Southeast.

Duke, John [91] see Morin, Jesse

Duncan, Emily [259] see Peixotto, Becca

Duncan, Neil (University of Central Florida), Peter E. Siegel (Montclair State University), John G. Jones (Archaeological Consulting Services), Nicholas Dunning (University of Cincinnati) and Deborah M. Pearsall (University of Missouri-Columbia)

[180] *Causes and Consequences of Colonization in the Caribbean: What Is Known and What Is Unknowable*

One of the defining characteristics of humans is our propensity to migrate. However, the push or pull factors resulting in human migrations may be impossible to know in some cases. Furthermore, our sole reliance on the archaeological record may mislead our understanding of the timing and impact of migrations. Recognizing migrations in the archaeological past is made especially difficult in cases where migrating groups were small, leaving ephemeral traces of their occupations. Paleoenvironmental indicators provide clues to human activities that may predate known archaeological material remains. This paper will explore the interplay of cultural, social, and environmental causes for migrations into the Caribbean beginning at least 8,000 years ago and the environmental consequences of human occupation in the region.

Dung, Lâm Thị Mỹ [271] see Huffer, Damien

Dungan, Katherine (Archaeology Southwest), Sylviane Déderix (School of Anthropology, University of Arizona), Barbara Mills (School of Anthropology, University of Arizona), Kristin Safi (Oak Ridge National Laboratory) and Devin White (Oak Ridge National Laboratory)

[130] *Local Visibility and Monumentality in the Chaco World: A Total Viewshed Approach*

Chacoan great houses are considered "monumental," in the sense both of scale and of conveying meaning. Throughout the Chaco World, great houses and other large-scale buildings would have been associated to some degree with a larger, regional Chacoan ideology. At the same time, these structures vary and should be understood in the context of diverse local and regional histories. Visibility can be a key component of monumentality, and it has been suggested that great houses were frequently placed to be highly visible. We use "total viewsheds"—cumulative viewsheds generated using regularly spaced points across a complete study area—to examine the degree to which Chacoan buildings were positioned to maximize these structures' visibility within their local landscapes, which required leveraging advanced GIScience algorithms and techniques, as well as substantial supercomputing resources normally unavailable to archaeologists. The data aggregated by the Chaco Social Networks Project facilitate temporal and regional comparisons of visibility between AD 800 and 1200 across a sample of approximately 300 Chacoan buildings. The results of previous social network analyses allow us to consider the visibility choices made by the builders of Chacoan structures in light of the dynamics of intra- and intercommunity spatial and social organization.

Dungan, Katherine [303] see Clark, Jeffery

Dunn, Stacy (Edinboro University Department of Criminal Justice, Anthropology, & Forensic Studies)

[359] *Adolf Bandelier's 1892–1894 Expedition to the Central Coast of Peru*

Adolf Francis Alphonse Bandelier (1840–1914) was an ethnologist and archaeologist best known for his work in the American Southwest. What is less well-known is Bandelier's later years studying the ancient Andes, such as his 1892–1894 expedition on the central coast of Peru. Due to an unstable political environment, he moved his expedition to the Bolivian highlands and instead wrote about highland myths. Shortly thereafter, he passed away while pursuing historical sources in Seville, Spain to supplement his South America research. As part of the late nineteenth century shift toward an emphasis on material culture as a more truthful witness to the human past than the written word, Bandelier emphasized combining geographical, ethnological, and archaeological data to provide a more comprehensive portrayal of ancient societies. Unfortunately, Bandelier never had the opportunity to fully analyze or publish his work in central coast Peru. However, approximately 90 cases of items, including journals, watercolor maps, and photos, from his 1892–1894 expedition reside in the collections of the American Museum of Natural History in New York. This paper presents the details of Bandelier's life and work from this period based on these archival materials, along with some preliminary examination of the materials he recovered.

[359] *Chair*

Dunnavant, Justin (University of Florida)

[203] *In Search of King Tona's Palace: The Politics of Archaeology and Memory in Southern Ethiopia*

In 1896 Emperor Menelik II of Abyssinia engaged in one of the bloodiest battles of his military campaigns, attempting to unseat King Tona of Wolaita. After two weeks of fighting, King Tona was captured and the royal court devastated. The last palace of the Wolaita Kingdom stood in Dalbo just 10 km northeast of the current city of Soddo. While the general location of King Tona's palace is known, contesting narratives situate the exact location at different sites. This paper reports on findings from a 2016 survey and excavations at Dalbo in search of the palace of King Tona. Although the excavations revealed evidence of a stone foundation and wooden structure, the materials are unlikely associated with the famed palace of the Wolaita King. Instead, analyses of the ceramic and lithic material allude to a long occupation history at the site that may stretch back as far as the Middle Stone Age. These findings provide insight into the development of complex societies in southern Ethiopia and, interestingly, unearth key contentions of memory and forgetting within contemporary Wolaita social politics.

Dunning, Nicholas (University of Cincinnati), Armando Anaya Hernández (Universidad Autónoma de Campeche), Christopher Carr (University of Cincinnati), Deborah Walker (Florida Museum of Natural History) and Helga Geovannini Acuña (Universidad Autónoma de Campeche)

[337] *Preclassic Reservoirs and Urbanism at Yaxnohcah, Campeche, Mexico*

The need to collect and store rain water has been proposed as an important urbanizing force during the development of Maya civilization in the Elevated Interior Region on the Maya Lowlands, where surface water is naturally scarce and the dry season lengthy. We present data from Yaxnohcah, Campeche, Mexico indicating that the construction of large reservoirs was an integral part of the development of this urban center in the Middle and Late Preclassic periods. Data collected to date indicate that the water management system at Yaxnohcah became more sophisticated over time. Investigations are ongoing and seek to further document this early, complex water management system.

Dunning, Nicholas [83] see Beach, Timothy

Dupont-Hébert, Céline [190] see Woollett, James

Dupras, Tosha (Department of Anthropology)

[219] *The Elite Meroitic Necropolis of Sai Island, Part II: Bioarchaeological Interpretations*

Five Meroitic necropoli have been identified on Sai Island, located in northern Sudan between the 2nd and 3rd Nile cataracts. Recent archaeological excavations conducted by the French Unit of the National Corporation for Antiquities and Museums have focused on a small elite Meroitic necropolis (300 BC–AD 350). Although the archaeology of this necropolis is complicated by interments from other periods and looting, here we present the initial analyses of the Meroitic elite skeletal remains in concert with their contextual information, including demography, paleopathology, and stable nitrogen, carbon and oxygen isotope analyses, in an effort to reconstruct the life histories of this segment of the Sai Island Meroitic population.

[219] Chair

Dupras, Tosha [82] see Rumberger, Jacklyn

Dupuy, Paula (Nazarbayev University)

[209] *The Intersection of Clay and Fiber in Central Eurasian Prehistory: Methods for Evaluation*

This presentation focuses on analytical techniques for evaluating cloth and fiber characteristics imprinted on ceramic vessels, and how reconstructing textile industries contribute a social reading of Eurasian prehistory. Inner Asian Bronze Age pastoralists of the third—first millennium BC employed textiles to mold clay vessels as shown through woven fiber impressions coating the insides of containers. Although this production technique has preserved an otherwise marginally documented industry of early pastoralists, it has been methodologically challenging to accurately measure the morphological and structural features of cloth examples. The challenge not only stems from the lack of preserved textiles for comparative purposes but also from the rough surface texture of coarsewares that mask diagnostic features of fibers and weaves when viewed at close range. This paper outlines positive results from trials using high-resolution digital technology to examine textile features preserved in Bronze Age pottery from pastoral campsites of southeastern Kazakhstan. Findings suggest weaves and fiber processing were non-uniform across campsites and ecological micro-regions. Most significantly, the cross-use of textiles and clay in craft production demonstrate complex institutional ties and spheres of interaction among prehistoric pastoralists of central Eurasia that yield a new pattern for social exchange in this region.

Duran, Paul A. (New Mexico State University), Fumiyasu Arakawa (New Mexico State University) and NMSU 2015 Field School (NMSU Student Collaboration)

[303] *Research Analysis of Toolstone Procurement Patterns in the Gila Forks Region and Beyond*

Lithic data from Twin Pines Pueblo in the Gila Forks region of New Mexico can shed new light on toolstone procurement strategies in the American Southwest. The goal of this research is to track the economic strategies among the Mimbres people by investigating stone-tool raw material distributions and procurement strategies. I begin by defining local, semi-local, and nonlocal lithic materials in the Gila Forks region. Then, I investigate how groups in this region procured and used different raw materials using both mass and metric analyses. These analyses allow us to understand general and particular patterns of raw material distributions and lithic reduction processes. For local and semi-local materials, I address the following points: 1) what types of tools were manufactured using particular raw materials, and 2) did residents at Twin Pines manufacture stone tools at the site or areas away from the habitation area? For nonlocal materials, I use X-ray fluorescence (XRF) analysis for obsidian tools and their debris. This analysis addresses issues of procurement from local obsidian quarries. My analysis ends with a discussion of local and regional interaction within the landscape, possible settlement patterns associated with procurement strategies, and toolstone variables between local and regional raw material sources.

Dussol, Lydie (University Paris 1 Panthéon-Sorbonne)

[174] *Ritual Fires and Ancient Maya Termination Deposits at Naachtun (Guatemala): An Archaeobotanical Perspective*

Termination rituals have been a well-documented practice among ancient Maya societies. Generally including the spread of broken artifacts on floors, the manipulation of ancestor bones, and the intentional destruction of architectural structures, termination deposits are believed to have served to symbolically “kill” a building at the time of its abandonment. Regardless of the nature or function of these different deposits, their frequent association with ashes, charcoal and burn marks clearly attests that fire was a central element in the ritual practices they originate from. Fire must have been necessary to burn incense, as it is the case in modern societies. But the complexity and the variability observed in the composition termination deposits encourage to consider that fires associated with them were also intentionally composed, implying a more complex relation to the vegetal world as materialized by wood and plants. This paper presents an archaeobotanical study of termination deposits dated from the Terminal Classic period (AD 830–1000) at Naachtun (Northern Petén, Guatemala), which aimed to better characterize their formation process and sociocultural significance.

[174] Chair

Dussol, Lydie [174] see Goudiaby, Hemmamuthé

Dussubieux, Laure (Field Museum of Natural History), Mark Hill (Ball State University) and Gregory Lattanzi (New Jersey State Museum)

[4] *External Standards for the LA-ICP-MS Analysis of North American Copper Artifacts: Looking at Different Approaches*

Ideally, data produced by different laboratories performing the same type of analysis should be comparable. Comparability is important for exchanging data and the building of large databases in particular areas of research. Recently, the sourcing of North American copper using laser ablation—inductively coupled plasma—mass spectrometry (LA-ICP-MS) has developed significantly, prompting questions about the compatibility of the different published datasets. Several parameters affect the compositions obtained with LA-ICP-MS. The selection of external standards is used with LA-ICP-MS to convert the raw counts for each element in concentrations expressed in ppm or w%. Ideally external standards have a composition as close as possible to that of the analyzed object. Available standard reference materials are purer than archaeological artifacts and a combination of several of them is often selected to be able to quantify all the elements of interest. LA-ICP-MS laboratories use different sets of standard reference materials based on their experience, budget, and availability. This paper will compare three sets of copper standard reference materials that are used routinely to measure the composition of North American copper artifacts. It will assess how they affect the concentration measurements in those samples.

Dussubieux, Laure [4] see Hill, Mark

Dutton, Hannah [326] see Paling, Jason

Duvall-Irwin, Benjamin [4] see Quinn, Colin

Duwe, Samuel (University of Oklahoma)

[34] *An Archaeology of Becoming*

From the emergence into this world to the settling of the modern villages, the Pueblos view their own history as a dynamic, living process. While key elements of Pueblo identity and worldview have always been with the people, migration experiences and the amalgamation of people with diverse backgrounds and beliefs were essential in shaping the culture and cosmology of each Pueblo group. This process—called “becoming” by Pueblo scholars—is never complete and represents the malleability of the Pueblo people and their ideas, as well as cultural continuity and resilience of their beliefs, in the past, present, and future. In this paper we propose developing an archaeology of becoming that captures the fluid and ever-moving character of Pueblo history as a nexus of identity, memory, and values, and use examples from the Keres and Tewa worlds to frame our discussion.

[34] Chair

Duwe, Samuel [34] see Cruz, Patrick

Dye, Thomas (T. S. Dye & Colleagues) and Timothy Rieth (International Archaeological Research Institute, I)

[81] *Warming to the Tempo of Change in Old Hawai'i*

Archaeologists sometimes claim that the refined chronologies yielded by Bayesian calibration make it possible to distinguish between Levi-Strauss's “hot” and “cold” societies. Historians of Hawai'i leave little doubt that Hawai'i was a “hot” society in the early historic period. A review and comparison of chronologies for the tempo of change in precontact Hawai'i distinguishes the “cold” society reconstituted by ad hoc methods from the “hot” society reconstituted by the Bayesian method. We make two claims: 1) the ad-hoc chronologies from Hawai'i are incongruous with the historical record, and 2) Bayesian chronologies provide context and time-depth for the “hot” Hawaiian society described by historians.

[112] Discussant

Dye, David (University of Memphis), Keith Jacobi (University of Alabama) and William DeVore (University of Alabama)

[185] *The Wheel of Conflict: Physical and Spiritual Permanence of Mississippian Violence*

Violence in the daily lives of individuals in late prehistoric eastern North America took many forms. Exposure to violence was pervasive and persistent. From the time you were born until the time you died you were a witness, a participant, and possibly a victim. In some instances death was a not release. In the Tennessee Valley of northern Alabama two Mississippian sites, Kogers Island (1LU92) and Perry (1LU25), demonstrate a range of evidence for interpolity violence. Familiar examples of violent encounters observed include: facial mutilations, decapitations, general dismemberments and mutilations, scalplings, and healed and unhealed blunt force trauma to the skull. Human remains were displayed and curated as one aspect of cultural identity and history. In addition, new protocols for violence are coming to light that are rewriting our understanding of past violent behavior. Partitioning skeletal remains and the closely tied practices of transformative proxies speak to the interwoven nature of the physical and spiritual realms that permeated the daily lives of Mississippian people, alluding to more abstract experiences and practices than we have previously given credit.

Dyer, Meaghan (University of Edinburgh)

[92] *A Smashing Good Time: The Identification of Prehistoric Blunt Force Weapons Using Experimental Bioarchaeology*

Experimental bioarchaeology can aid identification of prehistoric weapons and inform current understanding of the context of violence and social interactions in small-scale societies. Determining the direct mechanism of cranial blunt force trauma in prehistoric cultures is currently a complex issue. A vast array of tools and weapons exist that can produce blunt force injury, complicating identification of individual weapons associated with archaeological cranial injuries. This paper presents a new application of an experimental skin-skull-brain model, which facilitates the testing of prehistoric wood, antler and stone clubs for comparison against the osteological record. Testing with early prehistoric materials from Western Europe has already yielded remarkable results. Due to the nature of prehistoric weapon technology, many of the Neolithic European weapons have clear parallels with known tools in North America. Most notably there are comparable ball headed clubs found in North America, along with other weapon-tools of similar nature to those tested in this research. This methodology is low cost, meets ethical standards and has improved accuracy over current animal analogues. The test results form a catalogue of fracture patterns that can aid identification of the mechanism of prehistoric trauma and facilitate the analysis of social implications of violence in small-scale societies.

Dyer, Jolon [190] see Solazzo, Caroline

Dzung, LamMy [113] see Kelley, Eric

Ea, Darith (APSARA Authority, Cambodia) and Kyle Latinis

[333] *Dating and Analyzing Koh Ker Settlement and Activity*

The popular narrative places Koh Ker as a short-lived, unconventionally planned, tenth century Angkorian city carved out of remote jungle following a capital shift under the reign of Jayavarman IV. The capital subsequently returned to Angkor and Koh Ker was swallowed by time and forest. A growing number of researchers find this untenable, seeing Koh Ker as a more sizeable, complex and enduring urban phenomenon based on recent investigations. 2015 excavations in the central urban core yielded basal activity dates in two sites consistently between the seventh and eighth centuries CE. Additionally, aspects of the pottery assemblage strongly resemble those from seventh–eighth-century sites at Sambor Prei Kuk. Mid to upper level and surface pottery include temporally definitive Khmer and Chinese wares, indicating site use from the ninth–fourteenth centuries and later. The tested sites are surrounded by massive tenth-century features. It remains unknown if middle and upper deposits represent continual use, periodic use, site repurposing during the tenth century and later, etc. Some aspects indicate the former while others indicate the latter. What is clear is that the area was very active for a long period.

Ea, Darith [271] see Stark, Miriam

Earley, Frank [175] see Huffman, Thomas

Earley, Caitlin (Metropolitan Museum of Art)

[321] *Captive Bodies, Captive Power: Reexamining the Role of the Captive in Ancient Maya Art*

Stripped, humiliated, and often sacrificed, the captive in ancient Maya art acted as a potent symbol of defeat. Captives are a central theme of Maya art, appearing on media from painted vases to carved stone monuments. However, discussions of ancient Maya captives often focus on their captors: rulers, usually depicted as conquering warriors. “Captive Bodies, Captive Power” investigates, instead, the captives themselves. Treating the captive body as a

cultural project that both modeled and reflected the embodied experiences of ancient people, I argue that depictions of captives performed ideas about world order and constructed specific social identities. Combining fieldwork in Chiapas, Mexico, with archaeological data and a broad survey of captive imagery across multiple media, the paper begins by reexamining the identification of captives in Maya art. Focusing on the carved stone captives of Tonina, the paper then explores the experience of captives, both actual and implied; and the role of the captive in establishing rhetorical relationships between the powerful and the disempowered. Moving beyond traditional studies of kings and nobles, this paper clarifies the identification and significance of captives in Maya art, revealing the power of the captive body to shape the ancient Maya world.

Earley-Spadoni, Tiffany (University of Central Florida)

[29] *Digital History and Digital Storytelling: The Future of Geospatial Technologies in the Study of the Past*

Geospatial technologies are revolutionizing the practice of the Digital Humanities, and these developments have direct relevance to the practice of archaeology. The most recent "spatial turn" among digital humanists can be attributed to the emergence of tools like ArcGIS that facilitate such investigations as well as an interdisciplinary convergence upon theoretical models that conceive of socially-constructed space. This paper will briefly review the current state-of-the-art in the sub-field of Spatial History as well as discuss a number of its emerging trends such as Deep Mapping, Digital Storytelling and Data Visualization, utilizing examples from the Vayots Dzor field project in Armenia. This paper will argue that archaeologists have much to gain from interdisciplinary engagement with the digital humanities.

Earnshaw, Jacob

[77] *Cultural Forests in Cross Section: The Exposure and Destruction of CMT Chronologies on Vancouver Island's West Coast*

Culturally Modified Trees (CMTs) bearing the scars of First Nation's resource use are ubiquitous in British Columbia's old growth forests, yet remain one of the most endangered archaeological site types due to industrial logging. The majority of CMTs are bark strip features with precise spatial, temporal, and harvesting pattern data that, when viewed on a landscape level, have great informative value related to forest use. However, CMT use in archaeological studies has been infrequent, small scale and largely confined to gray literature. Studies that do include CMTs have not accounted for the presence of invisible or "embedded" scars, which have fully healed over and cause unknown bias to samples. My research in Nuu-chah-nulth territory on Vancouver Island compares gray literature on CMTs taken from standing forests with data collected during surveys of stumps within expansive old-growth clearcuts. Logging activity has exposed the actual spatial extent and temporal reach of CMT archives in the landscape to be considerably different from what is recorded in Archaeological Impact Assessments. The wealth of data in cross-sectioned cultural forests may lead to greater insights regarding indigenous forest management and conservation strategies, local histories prior to and during the contact period, and greater old-growth protections.

[77] *Chair*

Eastman, Jane (Western Carolina University)

[160] *Connestee and Pisgah Contexts in the Tuckaseegee Valley of Western North Carolina*

This paper considers the stratigraphic evidence for Connestee series and Pisgah series components in the Tuckaseegee Valley of Western North Carolina.

Easy, Samantha (University of Toronto)

[318] *Archaeology as Storytelling*

The rise of open-source publications has increasingly made archaeological research available to wider audiences and yet the knowledge we as archaeologists produce is not always freely accessible or available. It is fully understood within our discipline that archaeological sites have strong connections to the past; that they are embodied spaces and irreplaceable sources of knowledge. However, this view of sites does not always extend to the broader public or to communities with ties to those spaces. In the course of my research on the Mid to Late Stone Age, I have often encountered disparities between the way I value sites or artifacts and the ways in which they are seen by community members or developers. The potential for archaeology to be active in shaping social order lies in the way we imagine the connection between ourselves and the past, and in how reconstructions of the past influence everyday action. I argue that storytelling is a form of transformative pedagogy which has the potential to foster engagement with sites and artifacts, and to extend archaeological knowledge beyond academic institutions by establishing connections between sites and living communities and providing the space for people to engage with the past.

Ebell, Biron [246] see Steuber, Karin

Ebert, Claire (Pennsylvania State University), Julie Hoggarth (Baylor University), Brendan Culleton (Pennsylvania State University), Jaime Awe (Northern Arizona University) and Douglas J. Kennett (Pennsylvania State University)

[81] *A Bayesian Model-Based Comparison of Radiocarbon Chronologies for the Earliest Complex Societies in the Maya Lowlands*

Sedentary agricultural villages, ceramic technology, and evidence for institutionalized socioeconomic inequality first appeared in the Maya lowlands during the Preclassic Period (1200 cal BC–cal AD 300). The chronological details of these significant cultural developments between different regions of the lowlands remain unclear in many cases because of an emphasis on local ceramic typologies that are often difficult to correlate. We use a Bayesian framework to model high-resolution AMS 14C dates from the Belize Valley site of Cahal Pech, one of the earliest known permanently settled communities in the Maya lowlands, to understand the site's spatial, demographic, and sociopolitical expansion during the Preclassic Period. We also developed radiocarbon chronologies and summed probability distributions of over 900 published radiocarbon dates from Preclassic sites in other core regions of the Maya lowlands. Comparisons of regional temporal trends to paleoclimate proxy records indicate that stable climatic conditions through the Middle Preclassic promoted the hierarchical development of large regional polities across the lowlands. A severe multi-century drought at the end of the Late Preclassic (~cal AD 100–300) likely contributed to the decline of some major polities in the Petén, though evidence for continuity of populations and site growth exists in other regions.

Ebert, Claire [81] see Hoggarth, Julie

Echavarri, Mikhail (University of Washington) and Stephen Acabado (University of California Los Angeles)

[265] *Landscape Modification and Social Change as Resistance among the Ifugao on the Borderlands of Spanish Philippines*

Dominant historical narratives suggest that groups located on the periphery of colonial empires and states received minimal influence from the latter. However, recent studies that focused on borderlands indicate substantial culture change and ecological manipulation that contributed to successful resistance against conquest. The Ifugao Archaeological Project (IAP) investigated the colonial borderland of Spanish Philippines, focusing on the role of the adoption of wet-rice cultivation and landscape manipulation as a means to resist conquest in Ifugao, northern Philippines. Our paper presents the

findings from the IAP as they illustrate how the Ifugao intensely remodeled their environment and social structure for both subsistence and deliberate resistance against the Spanish.

Echeverry, David [227] see Anderson, David

Eck, David [366] see Tsismeli, Evangelia

Eckersley, Jaclyn (Brigham Young University)

[390] *On the Verge: A Pottery Analysis of the Northern Periphery of the Northern San Juan Region*

Beef Basin is a geographic area located roughly 30 miles northwest of the Abajo Mountains in southeastern Utah. Archaeologically, Beef Basin is within the Northern San Juan Region, which has seen much recent and intensive study. Most of this research has focused on the area south of the Abajo Mountains, however, leaving the northern areas, including Beef Basin, only marginally studied. I discuss the results of pottery analyses from the area and discuss recent reconnaissance survey conducted by the Bureau of Land Management. I also present a chronology for the area based on ceramic dating. From previous research we know that Pueblo I occupations in the study area were scant to nonexistent, but population increased dramatically in the subsequent Pueblo II and Pueblo III periods. I discuss the later occupations in the context of a hypothesized widespread northwestern migration in response to late Pueblo II period Chacoan system proliferation.

Eckert, Suzanne (Arizona State Museum), David Hill (Pueblo of Acoma) and Judith Habicht-Mauche (University of California, Santa Cruz)

[155] *Exploring the Keresan Bridge: Acoma Glaze Ware Pottery Production and Exchange in an Interregional Context*

In recent years, patterns of decorated pottery production and exchange, as revealed through mineralogical, chemical and isotopic characterization analyses, have been central to modeling the interregional dynamics of late precontact social networks in the American Southwest. However, the role of the Acoma region within these networks remains poorly studied and largely unknown. In particular, questions remain about the significance of the Acoma or Western Keres region as a potential "bridge" facilitating the transfer of people, materials, ideas and practices between the Western and Eastern Pueblos during the thirteenth and fourteenth centuries. By presenting results from petrographic, INAA, and lead isotope analyses from a small sample of Acoma glaze ware pottery we begin to fill this critical gap. By comparing these data with comparable INAA and lead isotope datasets from both the Zuni and Albuquerque areas we attempt to develop a clearer picture of social interactions across this east-west corridor.

Edinborough, Kevan, Peter Schauer (University College London), Andrew Bevan (University College London), Mike Parker Pearson (University College London) and Stephen Shennan (University College London)

[216] *Supply and Demand in the Neolithic Quarry Production of Northwest Europe*

What factors influenced non-agricultural production in prehistory? This has long been a topic of debate in prehistoric archaeology, because it relates to the question of whether people in prehistoric societies had 'economic' motivations and what those might have been. The paper presents the first results of the NEOMINE project, which is analyzing the evidence for stone quarrying and flint-mining and the factors affecting consumption of their products by Neolithic early farming communities in Britain and North West Europe (c. 5300–2000 BC). The project's aim is to evaluate what economic factors, if any, had an influence on their scale and intensity, and in particular the extent to which the amount of material they produced varied over time in response to external demand. Using newly collected and newly updated radiocarbon data on the dating of Neolithic mines and quarries in the region we will test whether their periods of use correlate with periods of high population and therefore high demand in the area surrounding the mine, using summed radiocarbon probabilities as a population proxy, taking into account sampling variation and fluctuations in the calibration curve. We go on to explore how the results compare with the patterns evidenced ethnographically in New Guinea.

Edinborough, Kevan [176] see Brown, Thomas

Edinborough, Marija (University College London), Sarah Fearn (Imperial College London), Imre Lengyel (University College London), Dusan Boric (University of Cardiff) and Kevan Edinborough (University College London)

[235] *Life History from Human Teeth Microstructure: Methods for the Analysis of Hydroxyapatite from Tooth Cementum*

Life-history events such as pregnancies, skeletal trauma, and renal disease can be estimated from growth layers of tooth cementum. Cementum is a mineralized tissue surrounding root of each human tooth consist of an inorganic calcium phosphate mineral approximated by hydroxyapatite (HA) and collagen. Several parameters have an influence on the calcium metabolism and result in a lack of available calcium at the mineralization front of tooth cementum. The year of occurrence of certain life-history events can be precisely dated by hypo-mineralized cementum growth layers. On the basis of comparative study of HA from teeth derived from living humans (clinical patients) and Mesolithic-Neolithic inhabitants of the Danube Gorges (Serbia) this paper demonstrates the archaeological potential of HA research. We applied three methods for HA composition analysis: 1) fluorescence microscopy in order to detect presence of HA in the samples; 2) SEM-EDX analyses for elemental mapping; and 3) TOF-SIMS technique which enables localization of HA and identification of different CaP phases. We argue that the minimum number of possible pregnancies in females and other life history events as well as the accurate age of those events may have been revealed for the first time by this study.

Edwald, Agusta [207] see Oliver, Jeff

Edwards, Briece (Confederated Tribes of Grand Ronde)

[108] *Discussant*

Edwards, Matt (SWCA Environmental Consultants)

[147] *Discussant*

Edwards, Richard (UW-Milwaukee)

[102] *Oneota Risk Management Strategies and Agricultural Practices*

By its nature, agriculture is a risky endeavor. Unsatisfactory conditions for innumerable environmental or social factors can shift harvests from a bumper crop to famine (e.g., drought, poorly timed frost, enemy raids). All agricultural societies develop practices to mitigate this risk; however, the methods

employed are dependent on the environmental contexts, social settings, and historical trajectories of a given group. This study examines paleoethnobotanical and landscape data to determine the types of risk management strategies used by Oneota groups in the Koshkonong Locality of southeastern Wisconsin. It also investigates how these buffering strategies were integrated with other cultural practices of the Late Prehistoric in the Great Lakes region.

Eeckhout, Peter [358] see Praet, Estelle

Eerkens, Jelmer (University of California, Davis)

[286] *Stable Isotope Perspectives on Intra-Community Sharing*

Stable isotope analyses of human skeletal tissues provide estimates of paleodiet at the scale of the individual. This paper explores intra- and intercommunity variation in stable nitrogen, carbon, and sulfur isotopes in human bone and teeth as insight into the prevalence of food sharing in several ancient hunter-gatherer burial populations in California. The goal, in particular, is to trace intra-community variation over time to examine how cooperative foraging and food-sharing strategies evolved over several thousand years as regional population levels gradually grew.

Eerkens, Jelmer [219] see Martinez, Marcos

Efford, Meaghan (University of Victoria), Nicole Smirl (University of Victoria) and Brittany Walker (University of Victoria)

[263] *Marble Monument Conservation in the Emanu-el Cemetery*

The Emanu-el Jewish Cemetery in Victoria, BC, Canada contains a wide array of plot sizes and monument styles. This project focuses on the marble monuments dating from 1860 to 1910, many of which are now lying flat and cemented in place because they are too fragile to stand on their own. Marble monuments were popular because of their beauty and the malleability of this type of stone. The elliptical shaped pores allows for more water and acids to enter and move into the stone, and the calcium carbonate within marble is very susceptible to acids, making marble a delicate choice. This poster discusses a selection of monuments and the environmental threats they face. The intention of this research is to offer suggestions on how to protect these delicate monuments, as well as bring attention to the design styles that have been the most durable. Included in this project are examples of marble monuments that have undergone attempted preservation through laying them flat and gluing them in place, further exposing the inscription to rain, acids, and debris. We conclude that current restoration attempts in the Emanu-El Cemetery need to be revisited and further effort in preserving the monuments should be considered.

Egan, Rachel (University of Colorado at Boulder) and Christine C. Dixon

[80] *Extending the Notion of Night: Volcanic Eruptions in Mesoamerica*

The recent research on archaeological evidence for nightly practices has profoundly shaped interpretations of the past. As scholars begin to investigate this unexamined portion of ancient life, it is essential to include associations of night beyond the time of day. Volcanic events strongly influenced life throughout ancient Mesoamerica and provide an alternative avenue of investigation into ancient experiences of a form of night created by ash. Volcanic eruptions, particularly those of significant size such as mega-eruptions, are known for ejecting ash into the atmosphere, creating a darkness even in the height of daylight and in some cases initiating what are sometimes termed dark ages of history. This paper explores the relationship between night, darkness, and volcanoes in Mesoamerica.

Egan, Rachel [293] see Dixon, Christine C.

Egeland, Charles P. (UNC-Greensboro, Department of Anthropology), Christopher Nicholson (University of Wyoming, Department of Anthropology), Kevin Covell (UNC-Greensboro, Department of Anthropology), Robert Sanderford (UNC-Greensboro, Department of Anthropology) and Kristen Welch (Colorado State University, Department of Anthropology)

[169] *Cutmark Orientation and the Identification of Skill in Experimental and Middle Paleolithic Contexts*

The process of skill accumulation can reveal a great deal about learning, cultural transmission, and the value ascribed by societies to particular tasks or behaviors. Such information is of great interest to Paleolithic archaeologists who are charged with reconstructing these behaviors over vast expanses of space and time. Zooarchaeological remains, and the butchery marks that appear on them, are a potentially rich source of information on skill. Here, we present experimental data on cutmark orientations produced by novice, skilled, and expert butchers with a variety of lithic raw materials and tool types. The results of these experiments are applied to a sample of ancient faunal assemblages in an attempt to track skill level in the Middle Paleolithic.

[305] *Chair*

Eguez, Natalia (Kiel University [Germany]), Carolina Mallol (AMBI-Lab Instituto Universitario de Bio-Organica) and Cheryl Makarewicz (Institute for Prehistoric and Protohistoric Archae)

[275] *Microstratigraphic Investigation of Nomadic Pastoral Campsites in Eastern Mongolia*

Since the origins of domestication, pastoral societies have been an exceptional example of adaptation and resilience. In recent years, studies focusing on herbivore fecal remains have shown the importance of these remains and their implication for identifying socioeconomic activities. Here we present a multi-proxy examination of these deposits for an accurate identification of herds penning. We use micromorphology of soil sediments and stable isotopes analysis combined with archaeology and ethnography to provide us new insights into past activity areas, land use, site formation processes, domestic use of fuel, manuring and stabling or foddering strategies. Mongolian mobile herders offer an exceptional ethnographical proof-of-concept to investigate the seasonal usage and occupation of pastoral camps, which is an important temporal variable in mobile societies, difficult to detect in the archaeological record. The application of this multidisciplinary approach will provide a robust framework to understand the complex interplay between human behavior and biology in a long-term perspective, and to contribute to spread knowledge about pastoral mobile societies and their value for archaeological, ethnographical and ecological research.

Ehrhardt, Kathleen (Illinois State Museum)

[4] *Current Approaches to the Study of Late Prehistoric North American Copper Materials: Contributions from the Hoxie Farm Site, Cook County, Illinois*

In North America, contemporary archaeometallurgical approaches to the interpretation of native and copper-base metals go far beyond simply recording the artifacts to probing long-standing and emerging questions related to the multiple and complex role(s) metal working and metals play in the social lives of ancient peoples. Research on the appropriate application of scientific or laboratory-based methodologies whose results augment descriptions

and provide robustness to inferences is developing rapidly. This paper evaluates and interprets the results of an analysis of a 273 copper-base metal dataset from three late prehistoric components (Late Fisher, Huber, and generic Upper Mississippian) at the Hoxie Farm site, southwest Cook County, Illinois. The analysis is structured within a "technological systems" framework. Formal, technological, and laboratory-derived observations (metallography, PXR) are employed to characterize the working techniques and the metals in the industries. Distributional, contextual, and comparative information are then drawn into a discussion that places the utilitarian, ornamental, and symbolic forms found in the industries within historical, technological, and social use contexts of Upper Mississippian peoples in the mid-continent. Middle Mississippian and Early Historic metal use are also important points of comparison.

Ehrlich, Richard (UCLA Cotsen Institute of Archaeology)

[279] *Microscopic Analysis of Sherds from Pit H85*

H85 is the largest pit discovered in the north-central area of Yangguanzhai. In 2014 the archaeological team took sherd samples from the 12 layers excavated up to that point. Where possible, the team took one sherd from each of the colors gray, red, and beige as well as both fine, levigated texture and coarse, tempered texture from each layer. Thin sections of these sherds were produced and examined under the microscope to determine the choice of temper and other steps in the preparation of the clay. The results contribute to our understanding of pottery production methods during the Miaodigou Phase.

Ehrlich, Daniel E. [234] see Tremblay, Anna

Eichner, Katrina (UC Berkeley)

[74] *Entangled Identities on the American Frontier: Army Laundresses as Cultural Brokers at Nineteenth-Century Fort Davis, Texas*

This paper focuses on the cultural slippage that occurs in frontier zones where competing worldviews create conditions for alternative, innovative, and layered performances of intersecting identities. As spaces of translation, frontiers are the ideal location to study entangled identities. Inhabitants of these queer landscapes constantly negotiate the multiple lived realities of often conflicting ideologies. I propose the use of third-space as a framework for understanding the fragmentation and fluidity of experience in the American frontier during the nineteenth century. This study considers materials utilized in the daily lives of black and Latina laundresses who worked at the multi-ethnoracial, military fort of Fort Davis, Texas. With their identity as Americans, women, care-takers, military employees, and racialized individuals constantly in flux, these women balanced their relationship with one another, the civilian community, and their military colleagues as a way of redefining and creating new personhoods and identities in the context of living on a geographic and cultural boundary. Moreover, the study considers the women's roles as cultural brokers who navigate contentious social and physical landscapes by simultaneous asserting, contesting, and reasserting their intersecting personhoods in their daily interactions and performances.

Eiselt, B. Sunday (Southern Methodist University)

[339] *The Canine Question: The Role of Dog Husbandry in Athapaskan Migration and Plains-Pueblo Exchange*

Plains-Pueblo Exchange is the study of interregional interactions during the Protohistoric Period (ca. AD 1450 to 1700) between the people and cultures of the Southern Plains and the eastern, frontier Pueblo communities associated with the Rio Grande Valley and its tributaries. Plains-Pueblo research has focused generally on issues of culture contact, culture history, and social evolutionary trajectories leading up to European Colonization, but has skirted the increasingly obvious fact that Plains participants were Athapaskan. Ambiguities in the testimonies of early Spanish chroniclers concerning the identities of named groups on the Plains detract from these occasionally, detailed accounts, which consistently emphasize the Athapaskan practice of long-distance trade and communal hunting aided by pack dogs. The maintenance of large packs, on the order of several hundred head or more, implies a significant commitment to sustained and intensive bison hunting in order to supply for the needs of so many animals. This paper considers the implications of Protohistoric Plains Apache dog husbandry for the Athapaskan migration, the transformation of Southern Plains economies, and ethnic interactions in the American Southwest.

Eixea, Aleix [169] see Real Margalef, Cristina

El-Behaedi, Raghdha (University of North Carolina Wilmington), Douglas Gamble (University of North Carolina Wilmington), Eman Ghoneim (University of North Carolina Wilmington) and Eleanora Reber (University of North Carolina Wilmington)

[154] *Using Remote Sensing to Monitor and Predict the Inundation of the Abu Simbel Temples, Egypt*

The Abu Simbel temples, commissioned by Ramesses II in Upper Egypt, are vulnerable to inundation due to the ancient structure's proximity to the Nile River. Because of the rapid rise of water in the Lake Nasser reservoir, large swaths of land are becoming submerged. In order to monitor the recession of the peninsula in which the structure is located on, remote sensing techniques were employed. Using Landsat 5, 7, and 8 multispectral images coupled with SRTM data, change detection and risk maps were created in order to inspect the changes in the reservoir water line from the years 1985 to 2016. Due to the strong absorption of water in the mid-infrared spectral channel of the satellite images, land-water segregation was possible. In addition, two different scenarios of reservoir rise, 1 m and 3 m, were tested to forecast possible effects. A series of statistical calculations were conducted to predict the amount of future inundation in the years 2020 and 2030 using the R software. Results showed that there was a 60 m retreat of the shoreline over the last 30 years for some segments of the peninsula and its surrounding areas, and an annual shoreline retreat rate of up to ~2 m.

Elberling, Bo [224] see Harmsen, Hans

Elder, J. Tait [194] see Sparks, Shane

Eldridge, Morley (Millennia Research Ltd)

[176] *Tsimshian Households and Trade: The View from Casey Point*

Large-scale excavations at GbTo-13 and GbTo-54 near Casey Point, Prince Rupert Harbour, revealed house remains whose differential contents of exotic features, goods, and wealth or status-signaling artifacts strongly suggest that one household ranked above others. All labrets and all mountain goat horn cores were associated with a single house. Even the households lacking these prestige goods have more wealth items than at almost any regional assemblage. The extraordinary amount of bracelets argues for a specialized production center. The faunal remains are markedly different from all previously described assemblages in the area. The amount of mountain goat was far greater than for any assemblage in the culture area or indeed likely on the continent. Grizzly bear and sea lion remains are also extraordinarily high. Trade with the Haida is indicated from amber. Trade, or perhaps direct acquisition with the interior, is indicated by interior mammals including fisher, lynx, caribou, and mule deer. The material at the site argues for it

being high-ranking in regional context, despite the significant difficulties in day-to-day life from its exposed location and landslide foundation. The strategic value of the location may have outweighed these difficulties.

Elefanti, Paraskevi [169] see Starkovich, Britt

Elia, Ricardo [234] see Perez-Juez, Amalia

Eliyahu, Adi [193] see Van Horn, Mark

Elizalde Mendez, Israel (Proyecto Templo Mayor), Amaranta Argüelles Echevarría (Proyecto Templo Mayor) and Ximena M. Chávez Balderas (Proyecto Templo Mayor)

[225] *Paleopathology Analysis of Animal Bones Found Inside the Templo Mayor Offerings*

In the excavations conducted by the Templo Mayor Project during the last decade, more than 100 individuals—including birds and mammals—have been found. Thanks to interdisciplinary research combining biology, ecology and veterinarian medicine approaches, it has been possible to study bone anomalies produced by different diseases and trauma in several specimens, such as golden eagles (*Aquila chrysaetos*), roseate spoonbills (*Platalea ajaja*), jaguars (*Panthera onca*) and wolves (*Canis lupus*). These animals were sacrificed during Ahuítzotl's reign (AD 1486–1502) and deposited into the offerings we analyzed. In this presentation we will discuss the pathological bone alterations produced by the interaction between humans and animals. The results of the analysis suggest that it is very likely that the animals were kept under captivity. Furthermore, the study of animal captivity has allowed us to deepen our understanding of the Mexica society, making it possible to reach new interpretations concerning the origin of the ritual goods and the power of the Mexica Empire at the end of the fifteenth century.

Elizalde Mendez, Israel [225] see Valentin, Norma

Ellens, Samantha (Wayne State University)

[317] *Tracing the Post-Emancipation Landscape of Dominica's Lime Industry*

In a time when global travel was fairly restricted, citrus lime consumption extended across the Atlantic, regularly appearing in British advertisements and utilized in the global perfume and beverage markets. Following abolition, in 1834, limes and lime by-products became the chief export of islands like Montserrat and Dominica. In the case of Dominica, lime production gradually developed, and by 1875, many lime estates were yielding exceptional profits. The L. Rose and Lime Company was one of the most successful enterprises in Dominica's agricultural history. It acted as the centralized point of processing for surrounding lime plantations, like Morne Patate. Analyzing the lime industry, this study seeks to understand how wage-based systems of labor transformed island economies after emancipation and how this shift was expressed physically and socially for the island's inhabitants. This work serves as preliminary research for a dissertation comparing Dominica's lime history with that of Montserrat's. Understanding the post-emancipation plantation landscape through an analysis of citrus limes engages with methods of transferable technology, sustainable agriculture, and networks of agency concerning the ways in which this industry impacted the lives of formerly enslaved laborers.

Elliott, Michelle (Université Paris 1, Panthéon-Sorbonne)

[174] *Flames, Ash, and Charcoal: Paleoethnobotanical Approaches to Understanding the Role of Fire in Postclassic Tarascan Ritual Practices*

Although ethnohistoric sources provide many interesting clues regarding the importance of fire in Postclassic Tarascan rituals, these practices are still not well characterized by archaeologists. We know that fire was omnipresent in Tarascan society, not just for ordinary, daily needs (heating, cooking, light, etc.), but also in a seemingly diverse variety of ritual practice that ranged from the public cremation ceremonies of deceased rulers to more humble household rituals carried out on a frequent basis. Paleoethnobotanical methods seem to provide an essential approach for reconstructing these acts that cross-cut the social hierarchy, as well as the spheres of private and public space. This paper presents an ongoing project that focuses on charcoal remains, hearths, and other loci of combustion in a variety of contexts at the site of Malpais Prieto, in the Zacapu Basin of northern Michoacán. Our objectives are to characterize systematically the range of fire-related ritual practices that occurred at the site and to determine how these varied among the different social strata, and in public vs. private contexts. We also investigate what types of wood resources were necessary for these practices, and the system(s) that were developed to obtain and manage them.

[174] *Chair*

Elliott, Michelle [251] see Fisher, Christopher T.

Elliott, Sarah (University of Aberdeen, UK) and Wendy Matthews (University of Reading, UK)

[275] *A New Multi-Scalar, Multi-Methodology for the Detection, Identification, and Analysis of Ancient Animal Dung*

Animal domestication has traditionally been investigated through archaeozoological approaches which can be problematic and may not detect the earliest stages in this important transformation (Zeder 2006). The study of dung provides an alternative line of evidence for the investigation of: animal presence and proximity, increased animal management, domestication and sedentism, potential secondary product use, animal diet and environment. To identify and analyze fecal material there is still the need for development of an integrated and systematic field and laboratory approach (Shillito et al. 2011; Shahack-Gross 2011). The standardization and integration of analytical methods for fecal material identification and analysis is the primary step required in future dung research. This research develops a multidisciplinary approach that integrates field and laboratory analyses of archaeological dung from the Neolithic with comparative reference to modern ethnoarchaeological samples as control data. The aim in this research was to develop a methodology that enables detection and examination fecal deposits in the field as well as in specialist laboratories. Once dung remains have been successfully located using field methods, interdisciplinary analyses in the laboratory can inform on their type, content and context and provide direct evidence on interactions and relations between animals and plants, humans and environments.

Elliott Smith, Emma [152] see Hixon, Sean

Ellis, Erle [242] see Bauer, Andrew

Ellis-Davies, Kate [193] see Lew-Levy, Sheina

Ellison, Leigh Anne (Center for Digital Antiquity)

[191] *Digital Archiving for Archaeological Projects*

Despite a growing awareness of the need to properly care for digital information generated through past and current archaeological research, many archaeologists remain uncertain of "best practices" in digital curation. As a result, it is not uncommon to leave consideration for the long-term care of digital information to the very last step in a project. At that point, proper care can seem overwhelming. In this poster we outline simple steps for preparing (and budgeting) for digital archiving before research begins, tracking digital files while research is ongoing, making decisions about what types of information to archive, and identifying characteristics of a good digital repository. We will also use real world examples from tDAR (the Digital Archaeological Record) to illustrate how researchers are preserving their digital materials for access and future use.

Ellwood, Brooks [281] see Watson, Rachel

Ellwood, Emily (Unearthed Solutions) and Bill Schneck (Co-Owner, Unearthed Solutions)

[287] *Forensic Materials Science Applications in Archaeology*

Forensic science and archaeology share many similarities in laboratory and field methods that are deeply rooted in geology, chemistry and biology. Questions addressed in forensic science contexts often include item/material identification and provenance, rarity (probative value), comparative examination for sourcing purposes, and accurate scene reconstruction. This paper will examine actual forensic cases and their archaeological analogs in order to demonstrate how current forensic analyses may be applied within an archaeological context.

Ellyson, Laura (Washington State University), William Lipe (Washington State University) and R.G. Matson (University of British Columbia)

[368] *Changes in Turkey and Artiodactyl Abundance in Central Mesa Verde and Northern Rio Grande Archaeological Assemblages*

Previous zooarchaeological studies in the Southwest indicate that over time, larger animal resources such as deer are replaced by smaller ones such as lagomorphs (cottontails and jackrabbits) and domesticated turkey in Ancestral Pueblo sites. These trends are identified on the basis of various faunal indices that measure the proportional abundance of one animal resource against another. In this study, we utilize an index that measures the proportion of domesticated turkey relative to artiodactyl (primarily deer) remains to explore temporal changes in the dietary importance of domesticated turkey. We use this index to make regional and temporal comparisons between the central Mesa Verde (CMV) and northern Rio Grande regions (NRG). Our results indicate that in the CMV, turkey became an important source of animal protein in later periods as artiodactyls decreased in abundance on the landscape. For the NRG, where artiodactyls evidently remained more accessible through time, people in this region did not rely as heavily upon turkeys.

Ellyson, Laura [142] see Lipe, William

Elquist, Ora (Public Archaeology Laboratory, Inc.)

[16] *A Fashionable Neighborhood: Archaic Settlement in Eastern Connecticut*

Regional studies of eastern Connecticut suggest seasonal movements between valley lowlands and uplands along the Connecticut River Valley, and year-round occupation of the Northeastern Highlands by mobile groups during the Archaic. The Public Archaeology Laboratory recently excavated a complex of sites in the Susquetonscut Brook drainage, a minor tributary located in a transitional zone between river valley lowlands and highlands. This site complex contains a wide range of occupation types, and their characteristics have produced new insights and questions regarding the timing, nature, and variability of broader regional settlement patterns.

[16] *Chair*

Elroy White, Gitta [49] see McLaren, Duncan

Elson, Mark (Desert Archaeology) and Maren Hopkins (Anthropological Research)

[84] *Carrying On the Tradition: University of Arizona Field School Excavations at University Indian Ruin*

Recent field school excavations at University Indian Ruin, under the direction of Drs. Paul and Suzanne Fish, have uncovered a wealth of new data. University Indian Ruin is a large Classic period Hohokam village situated in the eastern Tucson Basin. The site likely contains hundreds of adobe rooms and at least two platform mounds, a form of monumental architecture built by or for elites. In the late 1930s, such archaeological luminaries as Byron Cummings and Emil Haury investigated the site and trained archaeology students. The most intensive investigations occurred in 1940, when Julian Hayden and a crew of CCC workers excavated a room-block and the primary platform mound. After a hiatus of 70 years, the Fishes, joined by field school students and members of the local CRM community, reinvestigated the site for four field seasons between 2010 and 2013. This work resulted in intensive mapping and surface collection of the site, the testing of a second platform mound and a large borrow pit, and the excavation of several rooms, two of which were in the platform mound precinct and contained evidence for ritual closure. This paper summarizes our work and presents new data on the occupation of this highly important site.

[148] *Discussant*

Emberling, Geoff [219] see Breidenstein, Abigail

Emery, Kitty (FL Museum of Natural History, UF), Antonia Foias (Williams College) and Erin Thornton (Washington State University)

[5] *Exchanging and Sharing Food in the Classic Maya polity of Motul de San José*

Anthropologists often describe food as the cement that holds people together both by symbolizing shared values and by the practice of sharing food. But in Maya archaeology, "food" is also often assumed to have been acquired locally and consumed primarily at the family level, therefore having a limited role in creating and maintaining alliances except in special circumstances. In contrast, our recent interdisciplinary research at the Classic period Motul de San José polity, Guatemala, argues against this model and shows that basic foodstuffs like meat and corn were exchanged among sites and also among members of different status groups and occupations within those sites. In this case study we use data from Maya archaeological animal remains and food-related artifacts to explore how basic foodstuffs, not just special feast foods, were used as a social cement to identify and bind social and political entities.

Emery, Kitty [5] see Cunningham-Smith, Petra

Emesiochel, Calvin [394] see Ngirmang, Sunny

Emslie, Steven

[177] *Steven A. Weber and the Birth of the Society of Ethnobiology*

In June 1978, two young graduate students met while working for the U.S. Forest Service in Flagstaff, Arizona. At the time, I was organizing the 2nd Ethnobiology Conference to be held at the Museum of Northern Arizona in honor of two founding fathers of ethnobiology, Alfred Whiting and Lyndon L. Hargrave. Steve and I soon became friends and colleagues, spending many evenings over beers, and our conversations often centered on our mutual interests in interdisciplinary studies for which ethnobiology was a core component. We came up with the idea to initiate a Journal of Ethnobiology with papers from the 2nd conference as the first issue. Further, we believed this journal should be the basis for a new nonprofit society, the Society of Ethnobiology, and both were launched in 1981. This early history of the Society is presented here with Steve Weber's critical role. His foresight in developing this Society indicates how, early in his career, he was already having a huge influence on the field of ethnobiology. Now, over 35 years later, the Society and Journal remain strong and are a testament to Steve's lifelong contributions and dedication to ethnobiology.

[313] *Discussant*

Eng, Charlotte [392] see O'Neil, Megan E.

Eng, Jacqueline (Western Michigan University)

[115] *Late Bronze Age Women of the Steppe Frontier: A Bioarchaeological Analysis of Multiple Sites in Northern China*

The late Bronze Age in the Inner Asian steppe was a transitional period, with the adoption of mobile herding, as well as increasing sociopolitical interaction and complexity among groups in this region. Although archaeological studies have indicated that many steppe groups engaged in a variety of subsistence practices, pastoralism in general has been characterized as a rather uniform lifestyle; and nomadic pastoralism in particular has been associated more often with the role of males, i.e., as mounted warriors. The bioarchaeological study of ancient female "pastoralists" and their lived experiences, however, offer a broader perspective on life among these steppe communities, including potential variations in health, stress, and activity markers. This study focuses on the remains of adult females from four sites in northern China (from east to west): Jinggouzi (n = 35, 1000–600 BC) in Inner Mongolia; Xiaohandi (n = 33, 1500–1000 BC) in Qinghai; and Tianshan Beilu (n = 33, 1800–1200 BC) and Yanghai (n = 24, 1000–600 BC) in Xinjiang. The geographic diversity of these sites contributes to our understanding of how environmental variation, as well as temporal and culturally contingent factors may have led to differential frequencies of dental disease, stress in childhood and adulthood, and markers of activity among the women of these samples.

[115] *Chair*

Engel, Claudia [73] see Lukas, Dominik

England, Marcus [340] see Stanchly, Norbert

Enloe, James (University of Iowa), Amy Meehler (University of Iowa) and James McGrath (University of Iowa)

[299] *The Tale of a Rock: Backdirt, Backfill, and Intrusive Historic Occupations of Woodpecker Cave*

Prehistoric occupations in rockshelter deposits are frequently of interest to archaeologists because of potentially good preservation of material culture and the possibility of multiple occupations in stratigraphic succession. Those sought-after phenomena are frequently occluded by subsequent accretional or intrusive historic occupations. This is particularly complicating when modern investigations are carried out in the context of poorly documented earlier archaeological excavations. Determining the sequence and causes of such intrusive disturbance is necessary for defining the extent and stratigraphic position of intact prehistoric occupations. Treating the historic materials in the same manner as prehistoric finds may help clarify the interpretation of the prehistoric components, as well as helping modern investigators understand how such locations have been used in both older and more recent occupations. Woodpecker Cave is a rockshelter purportedly entirely excavated in 1956; recent investigations have yielded areas of undisturbed prehistoric occupations. The lack of existing datum markers from the earlier excavation complicated spatial and stratigraphic correlation with the modern excavation. Historic and modern photographs in conjunction with meticulous mapping of modern artifacts have been essential in establishing horizontal and stratigraphic relationships between early and later excavations and in discovering evidence of more recent occupations with spatial and behavioral implications.

[299] *Chair*

Enloe, James [54] see Marks, Theodore

Eppich, Keith (Collin College)

[125] *1,300 years of a Classic Maya Ceramic Tradition at El Perú-Waka', Guatemala*

In the course of 13 field seasons, archaeologists have carried out 23 operations across the ruined city of El Perú-Waka'. During these investigations, excavators recovered upwards of a million ceramic sherds from a wide variety of contexts; palaces, pyramids, residences, sheet middens, construction fill, ritual deposits, spoil piles, termination deposits, votive deposits, surface collections, burials, caches, and tombs. The excavation contexts are good enough, the quality of preservation generally high enough, and the quantity of sherds easily high enough to being to reconstruct the ceramic tradition of this ancient city. The Maya of El Perú-Waka' crafted a multitude of ceramic artifacts, from artistic polychromatic masterworks to low-end unslipped water jars and chamberpots. This includes all the ceramic vessels required for everyday life in the tropical rainforest of the Classic Maya. From this material, one can examine both the internal society of the city-state as well as the external connection to neighbors near and far. What emerges from this analysis is the distribution of quotidian ceramics and the exchange of high-end serving-ware. This exchange is not just between social units within the El Perú-Waka', or between this city and neighboring cities, but interaction between social units in different cities.

[125] *Chair*

Erb-Satullo, Nathaniel (Harvard University)**[323]** *Space and Scale in Reconstructions of the Social Organization of Craft Production*

Archaeologists often speak of production in spatial terms, contrasting nucleated and dispersed forms of crafting. However, the importance of the scale of spatial patterning in production activities (as opposed to "scale" in reference to quantitative output) has yet to be fully explored. It is impossible to relate the spatial distribution of crafting activities to a particular social organization of production without considering spatial scale. An examination of spatial distributions at multiple scales highlights significant variability beyond a nucleated/dispersed binary. For instance, a distribution that appears clustered at one scale may appear dispersed at another. A focus on spatial scale highlights complexities in the relationship between space and social organization. Dispersed, small production sites are often taken to indicate a lack of central administration, yet spatial centralization is not a strict requirement for social centralization. To build a robust production model, spatial ordering must be considered with reference to constraints on the distribution and management of resources and labor. Moreover, spatial data must be well-integrated with information on the techniques and practices of production. These arguments are illustrated using examples of metal production in Western Asia, focusing on my recent fieldwork in the South Caucasus.

[323] *Chair***Erdman, Katherine (University of Minnesota—Twin Cities)****[396]** *"Are You There Gods?" Offerings and Communication between Worlds in Protohistoric France*

Ritual offerings are inherently communicative; they are created or selected for the meanings they convey to the giver, other viewers, and the intended recipient(s). With this concept in mind, objects deposited in the Source of the Douix, a freshwater spring in eastern France, were recently examined to understand how people use offerings for communication in ritual practices. During exploration of the spring's subterranean karst system, cave divers observed human-made objects in the water. Through the collaborative effort of several local agencies in the mid-1990s, the spring water was diverted, the area explored, and artifacts dating from over two thousand years recovered. This paper presents the results of multiple levels of statistical and spatial analyses focused on the diverse objects from the Iron Age and Gallo-Roman periods. These results suggest the objects were given as offerings to a god or supernatural entity perceived to inhabit the spring, and provide insights as to why objects were selected to become offerings. The most significant conclusion reveals how people used offerings to communicate with their gods during rituals at the spring, but also, a more universal model for interpreting offerings from other geographic and temporal contexts.

[396] *Chair*

Erek, Cevdet Merih [90] see Basiran, Alper

Eren, Metin (Kent State University), Angelia Werner (Kent State University), Crystal Reedy (Kent State University) and Andrew Kramer (Kent State University)**[40]** *Assessment of Lateral Edge Grinding on Hafting Performance Using Experimental Clovis Points*

In the 1930s, F. H. H. Roberts proposed that lateral basal grinding was executed on Paleoindian projectile points to limit damage to the lashings that attached them to their shafts. This assumption is logical and widely accepted, but remains empirically untested. Here, we present an experiment that examines the role of lateral basal grinding in replica Clovis projectile points made of Texas chert. We compare via controlled ballistics experiments large samples of points with lateral edge grinding versus those with sharp lateral edges, but otherwise similar in every other morphometric aspect. The two point types are further divided by lashing type: animal derived silk fiber (similar to sinew) and flax cellulose fiber (both sealed with hide-glue). By analyzing and comparing the hafting performance of all four groups (ground, animal-fiber; sharp, animal-fiber; ground, flax-fiber; sharp, flax-fiber), we hope to better understand the function of lateral basal grinding, as well as any differences in use wear between animal-based and plant-based lashings.

Eren, Metin [40] see Pargeter, Justin

Eric, Marsh [91] see Castro, Silvina

Erickson, Katrina (National Park Service), Melyssa Huston (National Park Service) and William Reitze (National Park Service)**[304]** *A History of Service: The Civilian Conservation Corps at Petrified Forest*

Part of Roosevelt's New Deal Program, the Civilian Conservation Corps (CCC) was established in 1934 as a work relief program for unmarried men between the ages of 18 and 25. Designed to assist families during the Great Depression, the Corp members were paid \$30 per month, \$25 of which was sent back to help support their families. Up until its disbandment in 1942, multiple companies of these young men were stationed at Petrified Forest National Park (PEFO). Throughout their time at PEFO these CCC groups contributed to the construction and improvement of the park's existing infrastructure. The presence of these individuals in the park is represented today by limited historic documents, isolated artifacts, and historic sites including: sandstone quarries, park trails, culverts, trash scatters, the remnants of three CCC camps, and the park's existing waterline. Through archaeological surveys and research at Petrified Forest, we are better able to understand the extent of the impact these groups of young men had on the National Park Service.

Erickson, René (University of Oklahoma)**[364]** *Gauging Style: A Stylistic Analysis of Arkansas and Red River Valley Earspools*

Archaeologists have theorized that earspools functioned as symbolic adornments of high social status. However, earspools may also indicate the localized cultural practices of smaller communities within a larger region and highlight the role of specific individuals. By focusing on the sizes, material types, and decorative elements, I discuss the stylistic variations found within the temporal and spatial distribution of earspools in the Arkansas and Red River Valleys. These variations may indicate differences in social, ritual, or political practices within a broader cultural area.

Erlandson, Jon (University of Oregon), Todd Braje (San Diego State University), Kristina Gill (Santa Barbara Botanical Garden) and Torben Rick (Smithsonian Institution)**[32]** *Defining the Anthropocene on California's Northern Channel Islands*

California's Northern Channel Islands provide some of the most detailed and well-preserved records of human occupation of dynamic island landscapes in the world. Here, archaeological and historical ecological research over the past 20 years has produced a variety of data about human eco-dynamics in both terrestrial and marine ecosystems, spanning nearly 13,000 years. We summarize current knowledge of cultural and ecological changes from Paleoindian to historic times, focusing on what archaeological and paleoecological records tell us about when the Anthropocene might have begun on this archipelago. Contrary to current recommendations that the onset of the Anthropocene be defined as occurring during the past century or so, humans have actively transformed Channel Island ecosystems for millennia. Such transformations—the result of landscape burning, animal and plant

translocations, hunting, fishing, ranching, and other activities—have accelerated through time, but their effects can be traced back 7,000 to 8,000 years (or more) in terrestrial and marine ecosystems of the islands. Globally, ignoring such ancient human transformations will result in defining an Anthropocene devoid of anthropological data.

[180] *Discussant*

Erlandson, Jon [180] see Gusick, Amy

Ernst, Marlieke (Faculty of Archaeology, Leiden University) and Corinne L. Hofman (Faculty of Archaeology, Leiden University)

[395] *Breaking and Making Identities: Transformations of Ceramic Repertoires in Early Colonial Hispaniola*

Placed within the context of the ERC-NEXUS1492 research, this paper focuses on transformations in indigenous social and material worlds in Early Colonial Hispaniola. The initial intercultural encounters in the New World have led to the creation of entirely new social identities and changing material culture repertoires in the first decennia after colonization. The incorporation of European earthenwares in the indigenous sites of El Cabo and Playa Grande will be contrasted with the presence of indigenous ceramics and new manufacturing traditions in the early Spanish colonial sites of Cotuí and Concepción de la Vega. The transformation processes in ceramic repertoires will be assessed through a multipronged approach using theories of gift giving, appropriation and imitation combined with archaeological and ethnoarchaeological studies of the operational sequence (*chaîne opératoire*) of ceramic manufacture. The paper presents new insights into the dynamics of Amerindian-European-African interactions, mutual influences and resilience at the onset of colonial encounters in the Americas.

Erny, Grace

[277] *Settlement Scaling and the Emergence of the Greek Polis*

The collapse of the Mycenaean palatial centers at the end of the Late Bronze Age (circa 1190 BCE) and the nature of society in the ensuing “Dark Age” or Early Iron Age have long been important topics in the study of prehistoric Greece. The centuries after the collapse were characterized by a seeming decrease in population, changing patterns of settlement, less political centralization, a decline in trans-Mediterranean trade and the production of luxury goods, and the disappearance of the Linear B script used for keeping Mycenaean palatial records. Complex society did not reemerge on the Greek mainland until the rise of the Archaic Greek polis in the middle of the eighth century BCE. While both Mycenaean palaces and Archaic poleis can be classified as city-states, it is their political, cultural, and economic differences that are most often stressed. This paper will use settlement scaling theory to investigate continuity and change over the course of the Early Iron Age. Scaling relationships will be derived for Mycenaean settlements, Early Iron Age settlements, and several early poleis. Comparing the values of the pre-factors in these relationships will allow for a more nuanced understanding of the conditions necessary for the development of the polis.

Errera, Michel [23] see Sheridan, Alison

Ervin, Kelly (Washington University St Louis)

[168] *Recognizing Ritual in the Elaboration of Earthwork Construction at Jaketown*

Elaborately constructed earthworks indicate monumental behavior requiring unique social processes to produce. This paper presents new subsurface data on the Late Archaic Poverty Point earthworks at the Jaketown site in the Mississippi Yazoo Basin. Unit excavations and soil coring demonstrate detailed and complicated internal architecture standing in contrast to earlier mounded landscapes in the eastern United States. Challenging traditional agrocentric models for socially complex societies, this research provides a new perspective on the emergence of ritual complexity in the Lower Mississippi Valley, and more broadly urges a reform of the civilization narrative in archaeology with the elaboration of landscapes built by hunter-gatherers.

Eschbach, Krista (Arizona State University)

[64] *Discussant*

Escontrias, Pilar (Northwestern University)

[128] *Law, Private Property, and the Construction of the Family in the Archaeological Record of Colonial Moquegua*

In 1884, Friedrich Engels attributed the development of the nuclear family unit to the rise of the capitalist state and the subsequent emergence of private property in sixteenth-century Europe. In *The Origin of the Family, Private Property, and the State*, he posited that private property resulted in the restructuring of kinship practices where women gradually lost authority over their own activities, spaces, and their lives, and where the division of labor became gendered and spatialized. In this paper, I draw from political economic theories of property and anthropological studies of the family to shed light on the daily lived realities of indigenous social actors in colonial Peru. I explore private property and family materially by considering the adoption or rejection of nuclear households at two indigenous settlements of Sabaya and Torata Alta in the southern highlands in the department of Moquegua. I ask: to what extent did “Indios” at Sabaya and Torata Alta conceptually and materially embrace the concept of private property and how might archaeologists contribute to studies of private property?

Esdale, Julie (Colorado State University, CEMML)

[42] *Recognizing Artifact Transport from Debitage Assemblages: Examples from Middle Holocene Sites in Alaska*

When studying the technology of mobile foraging groups, tools and cores that pass through a site can be even more informative than those that end up deposited there. This is especially true in regions like interior Alaska, where cultural historical frameworks rely on the presence or absence of specific technologies or tool forms. A flake-attribute based debitage analysis combined with a minimum analytical nodule analysis can be integral for recognizing artifact transport. Examples from Archaic sites in Alaska demonstrate how identification of artifacts transported off site can influence cultural historical reconstructions, address co-occurrences of unrelated technologies, and contribute to theories concerning patterns of logistical organization.

[253] *Discussant*

Esdale, Julie [47] see Graf, Kelly

Eshetu, Zewdu (Addis Ababa University), Tsige Gebru Kassa (Addis Ababa University, Ethiopia), Valery Terwilliger (University of Kansas, USA), Mitchell Power (University of Utah, USA) and A. Catherine D'Andrea (Simon Fraser University, Canada)

[171] Burning Forests of the Past in Eastern Tigray

The influences of Ethiopia's paleoenvironments on its past societies may inform land management practices now. A staple for reconstructing paleoenvironments is to record paleovegetation changes. Botanical remains for reconstructing paleovegetation are usually archived in lake sediments. Eastern Tigray had the most developed ancient civilizations known to sub-Saharan Africa but no lakes. When we began research in Eastern Tigray, the region had been deforested for so long that botanists assumed the natural vegetation was juniper forest from inventories conducted elsewhere in Ethiopia. We found charcoalized wood to be ubiquitous in soils that had been exposed by gully erosion in Eastern Tigray, however. We started a reference collection and learned to identify larger charcoal fragments. Although we found evidence that juniper (*Juniperus procera*) forests had existed throughout the Holocene, they shared the landscape with vegetation types whose dominant species were less shade tolerant. Initial results suggested that climate may have influenced how forested sites were at any given time since forests were much rarer at ca. 2,100 m than at 2,500 m elevation. However, the quantity of identifiable charcoal in subsequent lower elevation sites near Mezber and Ona Adi suggests that factors other than climate could have a greater influence on vegetation types.

Eshetu, Zewdu [171] see Terwilliger, Valery

Eshleman, Sara [243] see Guderjan, Thomas Harold

**Espenshade, Christopher
[150] Discussant**

Espinosa Morales, Yolanda [349] see Domínguez, María del

Espinosa-Pesqueira, Manuel (Inst. Nacional de Invest. Nucleares [ININ]), Blanca Maldonado (Colegio de Michoacán), Isabel Medina-González (ENCRYM-INAH) and Gérald Migeon (CNRS-CEMCA)**[135] Noninvasive Analyses of Metal Artifacts from the Milpillas Site, Zacapu, Michoacán**

The West Mexican region of Zacapu (today Michoacán, Mexico) is known to have witnessed the rise and development of the Tarascan Empire during middle Postclassic period. Archaeological evidence indicates that this area underwent major spatial and social reorganization around AD 1200, events that indicate sociopolitical and ideological changes generated by the centralization of power in Tarascan society. Tarascan metallurgy represents a valuable reference for understanding the cultural context in which these transformations developed. This paper presents the results of a pioneering interdisciplinary research committed to the characterization of the microstructure of a collection of copper based metal artifacts—rings, bells, and other small items—all recovered from survey and excavation at the Milpillas archaeological site, (Milpillas phase AD 1250–1450), particularly from burial contexts. Based on a scientific methodology and the state of the art analytical techniques, all of them noninvasive (micro-XRD, SEM-EDX, micro-XRF and optical microscopy), this study is fundamental to our ability to generate new knowledge and databases on Tarascan and Western Mesoamerican metallurgy.

Espinosa-Pesqueira, Manuel [135] see Medina-González, Isabel

Estes, Aaron (Indiana University) and Alex E. Badillo (Indiana University)**[137] Settlement Survey of the Rural Mountainous Region of Quiechapa in Southern Mexico**

While extensive research has been conducted in and around well-known sociopolitical centers located in valley and coastal regions of southern Mexico, relatively little work has been done in the rural regions outside these core areas. Specifically, one of the understudied regions of southern Mexico is the mountainous region between the highlands and Pacific coastal lowlands. Recently, El Proyecto Arqueológico de Quiechapa (PAQuie) conducted a Full-coverage pedestrian survey of a 99 km² area in the municipality of San Pedro Mártir Quiechapa located in the mountains southeast of the Valley of Oaxaca. This paper will examine the methods and preliminary results PAQuie's 2016 field season. To better understand the occupation history of the region, project members documented prehispanic land use and settlement patterns using GPS equipment, and created a geodatabase of all visible features. Additionally, samples of diagnostic ceramics were collected and compared to existing typologies from neighboring regions, demonstrating changes in settlement patterns over time. Together, the Quiechapa time series maps and ceramic chronology provided valuable information regarding prehispanic occupation, settlement distribution, and how the people of the area might be connected to larger economic and sociopolitical networks.

Estrada-Belli, Francisco (Tulane University)**[29] Accelerating the "Maddeningly Slow Work of Archaeology" in the Forested Maya Lowlands**

Investigations in the thickly forested Petén region is complicated by lack of roads, water, communications, visibility and other things we often take for granted even in archaeology. In most cases the time it takes for results of such field work to reach a general audience can be measured in years. Many of us have turned to technology to alleviate this situation but the gains can be less than what is expected. The advent of GPS handheld devices have been useful to locate sites (and ourselves) much more efficiently in those vast uncharted regions, but the kind of automated GPS mapping that is common in most developed countries remains unattainable to some. Satellite imagery has also provided a bonanza of opportunities for archaeologists thanks to the increase in resolution and accessibility of this technology, but not so in the forested Maya lowlands where multi-canopy forest can obscure even the largest of urban centers built by the Maya. Lidar mapping has begun to alleviate many of these problems. Moreover, thanks to handheld devices, social media and virtualizations, our finds can now reach large audiences with incredible speed and with greater richness of content than ever before.

[131] Discussant

[131] Chair

Estrada-Belli, Francisco [101] see Cormier, Aviva

Etnier, Michael (Applied Osteology)**[228] Shifting Use of Mammals at Tse-whit-zen: Response to Gradual or Catastrophic Change?**

The mammalian component of the Tse-whit-zen village (WA) midden samples is typical of Northwest Coast archaeological sites. However, overall identification rates are quite low, with only 8% to 11% of the overall number of mammal specimens (NSP) identified beyond Class. This pattern is driven

by fragmentation and burning, with burned bone making up 18% to 44% of NSP. Burning rates peak in Chronozone 5 (CZ5, 525–1000 BP), while identification rates decrease steadily through time. Artiodactyls (deer and elk—3% to 7% of NSP) are the most abundant taxon, followed by dog (1% to 4% of NSP) and pinnipeds (seals, fur seals, and sea lions—1% to 2% of NSP). Pinniped use through time is stable. Artiodactyls peak in CZ3 (1550–1300 BP) at 7% of mammal NSP, but they were also increasing in the final stages of occupation of the site (CZ6 and CZ7, 525–50 BP). The initial increase in Artiodactyl use does not correspond to any of the seismic events documented at Tse-Whitzen. However, the peak of burned bone, and associated decrease in overall identification rates in CZ5 may reflect increased processing of bone for tool production and grease extraction following Event W, a seismic event dated to 420–570 BP.

Eusebio, Michelle (University of Florida)

[229] *"Call Any Vegetable": Culinary Practices in Neolithic and Metal Age Mekong River Delta*

Almost nothing is known about the early development and diversity of Vietnamese cuisine, which potentially has its origin more than 2,000 years ago. This research investigates the culinary practices in southern Vietnam during the Neolithic and Metal Age (3000 BC–AD 500) by analysis of food residues recovered from earthenware pottery. To identify former food contents, organic residue analysis was conducted on sampled pottery vessels recovered from two Neolithic sites (Rạch Núi and An Sơn) and two Metal Age sites (Lò Gạch and Gò Ô Chùa). Data assayed include lipid biomarker compound distributions, compound-specific carbon isotopes of palmitic and stearic acids, as well as bulk carbon and nitrogen isotope ratios of adhered residues. Results indicate that the people who inhabited these sites had broadly similar culinary practices, but differed possibly due to local ecology and differential access. Continuity of culinary practices involving the usage of earthenware pottery vessels to prepare and serve plant and aquatic food sources is observed from Neolithic to Metal Age. It is also demonstrated by the evidence for a common plant food source available within the vicinities of three inland sites. Results of this study contribute to the construction of long-term culinary heritage of Mekong River Delta.

[173] *Discussant*

[229] *Chair*

Evans, Adrian [100] see Donahue, Randolph

Evans, Christopher (University of Cambridge UK) and Marie Louise Sorensen (University of Cambridge UK)

[32] *(Mis-)Reading Land: Early Portuguese Settlement on Cape Verde*

This paper considers the early Portuguese settlement on Santiago Island, Cape Verde. Particularly focusing upon the towns of Cidade Velha and Alcatrazes, their immediate topographic settings clearly contributed to the long-term success of the former and the failure of the latter. Nonetheless, the results of a decade of excavation at Cidade Velha demonstrates how long it took for the colonizers to actually understand the landscape's environmental dynamics, especially the impact of seasonal flooding.

Evans, Susan Toby (Penn State University)

[217] *Evolution of the Aztec Tecpan Palace*

Sahagún called the Aztec palace a place of wisdom, and in the mature Aztec empire, sages of all kinds gathered in the tecpans and were members of elite families. The power of ruling families was based, in part, on their more sophisticated education, including divination and curing, and palaces as centers of knowledge served their communities. We know this from descriptions of contact-era imperial palaces, and we also know that these impressive places were the products of the evolution of the power structure of the Postclassic Period Central Highlands of Mexico. Tenochtitlan's tecpan dates from the 1370s, a time when the rising population of the Basin of Mexico stimulated the establishment of local tecpans to administer the larger villages. This paper uses archaeological and ethnohistoric evidence to trace the proliferation of Aztec palaces, and its implications for the potential for locally based diviners and curers, important purveyors of knowledge to their communities.

Evaschuk, Dana [17] see Budhwa, Rick

Everhart, Timothy (University of Michigan Museum of Anthropological Archaeology)

[241] *Woodland Systematics and Monumentality: A Preliminary Discussion of the Rediscovery of the Caldwell Mound*

The Caldwell Mound was a prehistoric conical mound located in the central Scioto River Valley, in modern-day Ross County, Ohio. Excavated by prominent amateur archaeologist, Donald McBeth in 1942, the Caldwell mound revealed a unique, if detailed funerary complex. Yet, these results remained largely unpublished. Exhibiting characteristics historically considered "Adena" and "Hopewell," the Caldwell mound presents either a call to update local cultural systematics or adds data speaking to a period of transitioning ceremonialism during the first half of the Woodland Period. A preliminary reanalysis of remaining artifacts and archival materials reveals interesting implications for a more holistic understanding of Woodland monumentality and the necessity of a recursive process in developing regional cultural systematics. This research also demonstrates the utility of research of incomplete archival materials and museum collections generated from the late nineteenth and early twentieth century excavations.

Evin, Allowen [85] see Ameen, Carly

Ewing, Diana (UNLV)

[47] *Sinew Thread Production and Properties in Western Alaska*

The production and functional properties of sinew thread are integral to the creation of Arctic Clothing. I focus on the creation of sinew thread from tendons and how production techniques affect thread usability in clothing production. Specifically, the strength and pliability of sinew thread. My reproduction of sinew threads is modeled upon the sinew used in extant Western Arctic garments in the collection of the Smithsonian Museum of Natural History. The strength of sinew thread is compared to that of modern commercially available threads to evaluate the durability of sinew in relation to readily available modern alternatives.

[314] *Discussant*

Ewonus, Paul (Vancouver Island University)

[319] *The Social Implications of Elk Hunting for Ancestral Coast Salish Communities*

Field, laboratory and archival archaeological research has helped to reconstruct important parts of the ancestral seasonal landscape in the southern Strait of Georgia. Contextual understanding of place provides a baseline for questions of sociality during the last c. 5,000 years prior to the colonial era. Evidence illustrates several of the historical processes through which community identities were brought into focus in the Coast Salish world. As an

example, I explore what is known about one of these narratives: the practice of hunting elk (*Cervus elaphus*). At most Northwest Coast sites deer (*Odocoileus*) is more common than elk (by NISP), and in the Salish Sea it can be strikingly so. While it is possible to consider both deer and elk together as simply cervids, I believe there are also reasons why their relationships with people in the past were not necessarily as similar as their taxonomy might suggest. Bound up with ritual life, I argue, a practical tradition focused on the elk hunt and consumption of the animal itself was emphasized among Coast Salish Peoples in the Fraser River delta and lower Fraser Valley. Over the millennia, ancestral communities identifying in part with this practice were formed through routine social engagement.

Fábregas Valcarce, Ramón [23] see Rodríguez-Rellán, Carlos

Fadem, Cynthia M. (Earlham College)

[305] *Paleoecological Assessment of the Douglas Korongo East and Bell's Korongo East Sites, Olduvai Gorge, Tanzania*

Current work at DKE and BKE in concert with The Olduvai Paleoanthropology and Paleoecology Project (TOPPP) has exposed Bed I and Bed II deposits, respectively. At DKE a series of tuffs and siltstones, including paleosols, indicates DKE hosted a series of productive landscapes through time. Paleosols have well-developed blocky structure and host large concentrations of fossils. At BKE sandy fluvial deposits adjacent to siliceous siltstones confirm previous descriptions of site materials. Cultural materials occur primarily in these fluvial sands, which are complex on a fine scale, featuring cross-bedding, density sorting, and carbonate rip-up class, indicating relatively high velocity water flow that would have attracted animals. Sediment mineralogy and chemistry, including stable isotopic analysis reveal the nature and formation conditions of deposits at both sites. Following assessment of site formation processes and artifact matrices, investigation of the continuity of tuffs and paleosols at DKE, and of channel-fill deposits at BKE will enable mapping of paleolandscape surfaces that would have been available to hominin populations. Additionally, dating and correlation of unnamed tuffs will allow calculation of sediment flux and provide more narrow age ranges for cultural deposits and paleolandscapes at DKE and BKE.

[79] *Discussant*

Faeder, Eymard [210] see Lenssen-Erz, Tilman

Fagan, John [100] see Ozburn, Terry

Faith, Tyler (University of Queensland) and Margaret Avery (Iziko Museums of South Africa)

[85] *The Promise and Pitfalls of Quantitative Paleoenvironmental Reconstruction in Zooarchaeology: Evaluation of Late Quaternary Micromammal Assemblages from Southern Africa*

Over the last several decades, Quaternary scientists have developed numerous techniques to generate quantitative paleoenvironmental reconstructions based on the taxonomic composition of fossil assemblages. The appeal of these methods is that, rather than providing reconstructions in qualitative terms (e.g., cooler versus warmer), they offer potential to generate numerical assessments. While these methods have been applied to a variety of fossil organisms, including pollen, diatoms, foraminifera, and chironomids, they are rarely applied to mammals. Our aim in this study is to explore the promise and pitfalls of quantitative paleoenvironmental reconstruction through the analysis of modern and fossil micromammal assemblages (rodents and shrews) from southern Africa. In a training set of ~150 modern assemblages collected from barn owl (*Tyto alba*) roosts throughout southern Africa, multivariate analyses demonstrate strong correlations between assemblage composition and several climate variables, especially those relating to precipitation seasonality. Transfer functions derived from these relationships are used to generate quantitative paleoclimate reconstructions for late Quaternary micromammal sequences from southern Africa's Cape Floristic Region, a region that features prominently in modern human origins research. We show that the methods of quantitative paleoenvironmental reconstruction offer untapped potential in zooarchaeology, but that there are also limitations that must be considered.

Faith, Tyler [371] see Niespolo, Elizabeth

Fallu, Daniel (Boston University) and W. Flint Dibble (University of Cincinnati)

[354] *Answers in the Dirt: Taphonomy, Preservation Bias, and Pastoralism at Iron Age Nichoria, Greece*

The assumed increase of cattle in Dark Age Nichoria has been a key piece of evidence for the "cattle-ranching" model of Dark Age Greek economy. New zooarchaeological analysis, however, demonstrates a distribution of more robust skeletal specimens which are likely the result of preservation bias, rather than economic reliance on cattle. Geoarchaeological analysis of "archival" soils retrieved from uncleaned bones provides some confirmation and additional detail: the abundance of cattle bones at Nichoria is likely the result of taphonomic, rather than economic, processes. Initial micromorphology revealed that the Dark Age assemblages were likely affected by soil formation, while calcium carbonate concentrations in Bronze Age layers protected bones from dissolution. Infrared analysis confirms that calcite is largely absent in the Dark Age soils. Further comparison of spectra shows that apatite, likely resulting from the degradation of bone, is present within the soil matrix. This matrix apatite is present in similar proportions in both the Bronze Age and Dark Age soils, suggesting some uniformity in process. While yet inconclusive, these results call into question the validity of a long-held economic model for the so-called Greek Dark Ages, and show the potential for geoarchaeological research even on sediments from earlier excavations.

Fan, XianJun [26] see Jin, Guiyun

Fan, Rong

[33] *Physiological Stress, Activity Patterns, and the Emergence of Social Complexity in Early China*

Because of a lack of artifacts or archaeological features which can indicate social status, the Early and Middle Neolithic periods ca. 7000–4000 BC in China are considered to be relatively egalitarian periods. Differences within and among settlements became pronounced in the third millennium BC. The adaptation of agricultural lifeways might be a cause of social complexity. However, it requires further investigation into how and why this happened. In the case when there are not enough artifacts to represent status, one way to investigate the emergence of social complexity is to look at whether differentiation exists beyond gender and age using human skeletal remains. During research, multiple lines of evidence from contextualized human remains were utilized. By comparing different degrees of enthesal changes, different dental wear patterns, duration of physiological stress which reflected on enamel hypoplasia, and trauma, combining the known data of stable isotopic analysis and other subsistence and mortuary practice information, the workload and nutritional distribution within communities was determined. In this presentation, data from two Middle Neolithic sites in northern China, the Xinglonggou site and the Beiqian site will be presented.

Fang, Hui [78] see Ma, Xiao

Faniel, Ixchel
[149] *Discussant*

Fanning, Patricia [38] see Davies, Benjamin

Fantoni, Marcello (Oxford University) and William Taylor (University of New Mexico)
[114] *Investigating the Methods and Practice of Ritual Horse Sacrifice and Butchery in Late Bronze Age Mongolia*

Although archaeological data link late Bronze Age cultures with the emergence of mobile herding in eastern Eurasia, the practices and social function of domestic horse sacrifice remain poorly understood. We investigated slaughter and butchery evidence from 18 sacrificial horse burials from the Deer Stone-Khirigsuur (DSK) Complex, a late Bronze Age Mongolian culture linked with the first emergence of horse herding and transport in the eastern Steppe. Using digital microscopy, we analyzed each specimen at 20x and 200x magnification, documenting visible cutmarks and perimortem fractures. Despite taphonomic variability, we identified consistent placement of cutmarks on the atlas, axis, and rear of the skull related to disarticulation, as well as the dorsal vertebral surfaces and the ventral skull, which may indicate the removal of meat prior to burial. Finally, we noted punctures to the brain case or orbital region of some horses, consistent with use of a small ax similar to Iron Age horse burials. Such wounds were not regularly observed on all sample horses, and were absent from several otherwise intact skulls, indicating variability in slaughter methods. Results support previous analyses linking late Bronze Age ritual sacrifice to feasting, and suggest continuity between DSK and subsequent equestrian nomadic cultures.

Farah, Kirby
[322] *Big Changes in Little Places: An Examination of the Political Strategies of Leaders at Late Postclassic Xaltocan, Mexico*

During the Late Postclassic the Basin of Mexico underwent dramatic political and cultural shifts, chiefly due to the formation and rapid expansion of the Aztec Triple Alliance. Xaltocan was among the many regional centers to be conquered and incorporated into the Aztec state. Historical documents indicate that prolonged conflict ultimately resulted in Xaltocan's conquest and partial abandonment, thus local leaders were not integrated into the new political framework and were replaced by Mexica leaders. This fundamental shift impacted the community as a whole, and several authors have effectively outlined the impacts of the transition to empire on commoner practices (Brumfiel 1991, 1996; Morehart 2010; Overholtzer 2012). This paper builds on these previous studies, but shifts the focus to Xaltocan's leaders and their social relationships with both the community and the state. Archaeological data collected from the successive residences of Xaltocan's leaders throughout the Postclassic demonstrate how both private domestic practices and public displays changed for Xaltocan's leaders over this transition. This paper will also address wider theoretical themes, particularly social memory and identity.

Farahani, Alan (University of California, Los Angeles)

[285] *Imperial Context and Agricultural Content: Dimensions of Space and Practice in Agricultural Lifeways in Dhiban, Jordan, 500–1400 CE*
In this paper the results of an archaeological case study are presented to argue that considerations of space, taken here to be a physical location in Cartesian terms, are essential to identifying changes in agricultural practice in premodern imperial contexts. The recording of the location of samples intended for paleoethnobotanical analysis, whether through digital or other means, allows for more nuanced reconstructions of the depositional routes of archaeological plant remains. In turn, these depositional routes can highlight the ways in which imperial interventions may un/intentionally restructure daily (agricultural) practice. Such techniques were utilized at the archaeological site of Dhiban, Jordan during excavations from 2009 to 2013. The tell of Dhiban was inhabited from at least 1000 BCE to 1500 CE, but it was transformed during two moments of imperial intervention, the Byzantine (300–640 CE) and Mamluk (1250–1450 CE) periods. The spatial visualization of over 200 analyzed and point-provenienced flotation samples reveals that communities at Dhiban responded to each of these moments of imperial intervention through changes in on-site depositional practices of daily waste as well as plant processing detritus.

[27] *Discussant*

[27] *Chair*

Farahani, Alan [27] see White, Chantel

Fargher, Lane (CINVESTAV del IPN)
[324] *Peasants, Agricultural Intensification, and Collective Action in Premodern States*

Historically, anthropological archaeologists assumed that intensification, in complex societies, involved a combination of population pressure and state direction, which culminated in the rise of powerful, centralized states. However, intensive research over the last 30 years has considerably altered our concepts of intensification and the state. Drawing on landscape archaeology and alternative pathways theory, we consider how diverse political-economic and landscape strategies interact to create complex socio-bio-physical environments. Specifically, we focus on the ways that rural populations (peasants) solved (or failed to solved) cooperation problems involving landesque intensification strategies that require large-scale quasi-voluntary participation in the context of varying political environments. Data from a wide sample of premodern states indicate that peasants pursued a wide of array of strategies that varied in degree of collectivity. In states low in collectivity, some peasants were able to overcome cooperation problems and invest in large-scale agricultural facilities; whereas in others, they failed to do so and agricultural strategies were limited to the household scale. In some highly collective states where food security was a concern, principals relied on preexisting intermediate-scale cooperative units to increase agricultural production; and, in others the state had to penetrate deep into society to build these cooperative units.

[215] *Chair*

Fargher, Lane F. [215] see Pérez Alcántara, Ivonne

Farias, Sabrina (Proyecto Especial Pahñu—TRIMP) and J. Heath Anderson (Minnesota State University—Mankato)

[120] *El Cerro Magoni en su contexto regional—extensión y significado del desarrollo Xajay*

En los años setenta, el arqueólogo Enrique Nalda describió por primera vez un nuevo tipo cerámico, lo cuál denominó Xajay Rojo Inciso Postcocción (RIP). En las décadas después surgieron nuevas investigaciones que giraban en torno a la definición cultura-histórica de lo Xajay que resultaron en el registro de cada vez más asentamientos asociados con el tipo. Actualmente se sabe que los sitios pertenecen temporalmente a finales del Clásico y

durante todo el Epiclásico, y que se encuentran comúnmente en las partes altas de cerros y mesetas en un territorio que abarca los estados de Hidalgo, Querétaro, Guanajuato, Michoacán y Estado de México. En ésta presentación, reportamos otro aumento del entendimiento arqueológico de ese territorio con el hallazgo de Xajay RIP en el sitio de Cerro Magoni en Tula, Hidalgo, que representa la presencia más sudeste de esta cultura hasta la fecha. Durante el Epiclásico se llevó a cabo una reorganización de la región local de Tula que terminó en la conformación del estado tolteca, un proceso en el cual Magoni parece haber tenido un papel importante. Planteamos que contextualizar los desarrollos locales con las pautas cultura-históricas regionales permitirá iluminar procesos culturales a múltiples escalas temporales y espaciales.

Farley, William (University of Connecticut)

[128] *An Analysis of Calluna Hill (59–73): Pequot Cultural Entanglement and Complex Consumption During the Pequot War*

This paper includes an overview of the Calluna Hill site (59–73) in Mystic, Connecticut, a 1637 Pequot village burned down immediately after the English siege of Mystic Fort. The site offers the opportunity to explore important methodological and theoretical questions. Here I focus on the village as the location of intense intercultural exchange and cultural entanglement. Calluna Hill offers insights into the complex ways that the Pequot consumed European-made goods and participated in capitalist markets. It also evidences a significant amount of Pequot agency, as European-made objects are intermixed with traditionally native goods and object-forms. Of note are the ways that the Pequot people indigenized European-made materials, refashioning them into forms exclusively useful to them. Often these new objects took the form of traditionally native tools and objects. Pequots at Calluna Hill labored to transform the goods gained from Atlantic capital markets for intensely local purposes including the pursuit of subsistence, intercontinental trade, and warfare. Geospatial analysis and multivariate statistics are used to analyze multiple lines of inference relying on artifactual, spatial, archaeobotanical, and zooarchaeological datasets.

Farmer, James

[375] *God Before Corn: Rock Art and the Origins of a Preagriculture Thunderstorm God in Ancient America*

This paper asserts that certain Ancient American painted figures traditionally associated with established rain, agriculture, or fertility deities, such as the Aztec "Tlaloc," in fact evolved from previously established Archaic preagricultural traditions that had already defined certain spiritual entities as "rain" or "thunderstorm" deities without reference to any formal agricultural practices. Evidence is drawn from iconographic and contextual analysis of anthropomorphic figures and motifs associated with the Barrier Canyon Anthropomorphic rock art style of pictographs, tentatively dated c. 2500 BCE–1000 CE, from the American Southwest. Imagery in this style suggests that Archaic hunter-gatherers may have identified an early form of "Thunderstorm" god unrelated to later formal agricultural practice. Direct field observations have associated specific site locations and imagery with geologic and climatic events directly tied to thunderstorm activity (thunder, flash-flooding, waterfalls, large-scale erosion, etc.). One implication of this assertion is that certain wide-spread, fundamental Ancient American "deities" may have originated long prior to and without need of formal agriculture. Comparisons to similar deities from later ancient American and other global mythologies support the contention.

Farquhar, Jennifer [27] see Rosen, Arlene

Farquhar, Jennifer (University of Pittsburgh), Joan Schneider (California State Parks, Colorado Desert District), Arlene Rosen (University of Texas at Austin), Yadmaa Tserendagva (Mongolian Academy of Sciences) and Michael Heilen (Statistical Research, Inc.)

[360] *The Intersection of Heritage Management and Academic Research: Results and Research Implications of Archaeological Survey of the Ikh Nart Nature Reserve, Dornogobi Province, Mongolia*

The Cultural Heritage Program at Ikh Nart Nature Reserve is an ongoing project sponsored by the Mongolian Academy of Sciences and Anza-Borrego Desert State Park (California State Parks). Over the past seven years, the project has focused on developing methods, strategies, and protocols for the management of the rich archaeological landscapes within the reserve. During this period, the project has recorded and assessed over 140 archaeological sites documenting more than 9,000 years of cultural history. A random sample pedestrian survey of about 1% of the 66,670 hectare reserve predicts that nearly 5,000 cultural heritage sites are present. This paper presents detailed survey findings including an evaluation of a predictive model focused on spatial and temporal relationships between cultural sites, land forms, and environmental features. These data are invaluable to ongoing efforts to characterize local socioeconomic patterns over time including subsistence, land use, settlement organization, and technological investment. Data will ultimately contribute to broader research concerning the development of pastoralism and the evolution of social and political complexity. The study is especially pertinent to research by the current authors focused on understanding the nature of human-environment interactions and the role of hunter-gathers and low level food production in the development of pastoralism.

Farrell, Michelle [133] see McLaughlin, Rowan

Farrell, Nancy

[362] *Discussant*

Fash, Barbara (Harvard University)

[39] *Leveraging Power: Stonecarvers and Architectural Sculpture Production in the Copan Region*

The abundance and diversity of monumental art, architecture, and hieroglyphic texts at sites outside the Principal Group in the Copan Valley, and into the hinterlands, illuminate the timing and intent of regal investiture of authority in elites considered important to the stability of the kingdom. The consistent use of two imagery programs in architecture, and the linking of one of those programs with textual confirmation of membership in the royal court, reveal two strategies for leveraging the production and distribution of political power and its display. Recent research highlights the emphasis on foreign inspirations of ideology at the valley site of Group 6N-1, Rastrojón, Copan.

Fash, William (Harvard University)

[39] *Piecing Together the Life History of K'ahk' Uti' Witz' K'awiil*

Copan's longest-lived ruler dramatically expanded his realm, reach, and resources. The valley population nearly doubled, and the historical record indicates he was active in the ritual and political lives of other centers both near to home and farther afield. Ruler 12 contextualized his defensive perimeter within the sacred geography of the valley by erecting six stelae in 652 CE. His successor enshrined that achievement and his memory in the most elaborately decorated temple outside the royal precinct, at the site of Rastrojón (6N-1), which formed part of that circuit. The first version of the Hieroglyphic Stairway was built above his elaborate tomb, securing his legacy in the royal center as well. Yet despite his 67 year reign, Ruler 12's constructions in the Acropolis are relatively modest in scale and elaboration. This focus on external affairs and the eschewing of grandiose public works in the royal precinct suggest a leader who was comfortable both in his own skin, and in the façades and facilities constructed by his predecessors. While

Ruler 12's earliest stelae are rather austere, in old age and after death he was depicted in Central Mexican garb, a possible clue about his political philosophy.

[71] *Discussant*

Faulkner, Patrick (University of Sydney) and Peter Hiscock (University of Sydney)

[168] *Ritual and/or Transformation: The Anadara granosa-Dominated Shell Mounds of the Australian Tropics*

Mounded shell deposits dominated by the mudflat bivalve *Anadara granosa* are highly visible features on the north Australian coast. Because of their distinctive, often monumental, features they have been a focal point for research into hunter-gatherer groups in these coastal environments. Interpretations of these mounded deposits have oscillated between those concerned with the functioning of prehistoric economic systems and those invoking ceremonial and ritual behaviors. In this paper we review these debates to make several points. First, the behavioral mechanisms involved in building Anadara mounds are still relatively poorly understood, and the details of construction dynamics need to be incorporated into models of both economy and social life. Second, models of all flavors must articulate with understandings of the degree of social and cultural change that has occurred in northern Australia over the last few centuries. We employ information on these points to evaluate the nature of ritualized behaviors involved in mound building and use. We advance the idea that these archaeological structures were a product of cultural systems with distinct economic and ideological components, and which subsequently underwent substantial transformations. We argue that the character of those transformations is the key to historicizing ritual behaviors.

Faulseit, Ronald (Field Museum) and Jeremias Pink (Oregon State University)

[136] *Who Owns the Cosmogram? Adaptations in Ritual Activity in the Wake of Political Transformation at Dainzú, Oaxaca Valley of Mexico*

Dainzú, located in the Oaxaca Valley of Mexico, has a long history of religious-ceremonial significance. In the Classic Period (AD 200–900), the site expanded significantly from its once small core into an urban settlement covering around 4 km². Our mapping project reveals that the new site construction was carefully planned out to represent a “cosmogram,” or spatial representation of the ancient Zapotec ritual calendar. After the decline of Monte Albán, Dainzú was slowly abandoned as people moved to smaller, regionally dispersed settlements. In that time, the relationship between the landscape, elites, and ritual activities in the region transformed as a new political order emerged. In this paper, I will present findings from recent excavations at the site, which help detail this slow transformation. Additionally, we will discuss patterns of ritual that also indicate cultural resilience in the wake of this political transition.

[205] *Discussant*

Faulseit, Ronald K. [7] see Pink, Jeremias

Faundes, Wilfredo [231] see Rivera, Francisco

Fauvelle, Mikael (University of California, San Diego)

[393] *Big Picture History in North America: Integrating Narratives of Our Continent's Past*

No society exists in isolation. In order to understand the history of North America it is therefore critical to see the continent as a landscape of mutually known and interacting places and peoples. One of the goals of this panel is to bring together specialists from different corners of the continent to share narratives of regional interaction in their areas. This paper will introduce the thematic and theoretical groundings for the session, suggesting that both systemic and historical models for understanding the past can be usefully combined in an approach that sees the continent as a known world with a shared history. We will use case studies from California's Northern Channel islands to argue for the importance of integrating regional histories and events into our models past processes and social changes.

[393] *Chair*

Fauvelle, Mikael [393] see Smith, Erin M.

Favila, Mario (Red de Ecoetología, Instituto de Ecología, A.C.), Leonardo López Luján (Proyecto Templo Mayor, INAH.), Janet Nolasco Soto (Red de Biología Evolutiva, Instituto de Ecología, A.C.), María Barajas Rocha (Proyecto Templo Mayor, INAH.) and Erika Lucero Robles Cortés (Proyecto Templo Mayor, INAH.)

[225] *First Report of a Dung Beetle (Canthon cyanellus LeConte) Found in an Offering of the Great Temple of Tenochtitlan*

We report for the first time, the presence of a species of dung beetle recovered from an offering found at the foot of the staircase of the Great Temple of Tenochtitlan. The dung beetle specimen was found on a copal (aromatic resin) ball and was identified as female of *Canthon cyanellus*, a copro-necrophagous scarab (Coleoptera: Scarabaeinae) by the presence of four clipeal teeth (exclusive characteristic of this species) and because its last abdominal sternite is continuous (characteristic of females). This species lives in tropical forests in the coastal plains of Mexico. A previous phylogeographic study of this species using nuclear and mitochondrial DNA molecular markers give us the possibility to explore the geographic precedence of the archaeological beetle. We extracted DNA of the femur of the right posterior leg of the beetle. Only the sequences of the nuclear gene Internal Transcribed Spacer Region 2 (ITS2) were successfully sequenced. Mapping the nDNA sequence of the archaeological beetle in the genealogical reconstruction of *Canthon cyanellus* in Mexico, we found that it belongs to the lineage formed with populations from the Pacific. This is the first molecular study in demonstrating the route from the Pacific coasts to the center of the Mexica Empire.

Fay, Kathryn (U.S. Army Corps of Engineers, ERDC-CERL) and George Calfas (U.S. Army Corps of Engineers, ERDC-CERL)

[124] *Endangered Cultural History: Global Mapping of Protected and Heritage Sites*

Through its many global missions, the United States Army has had an unfortunate history of failing to recognize and allocate sufficient resources to protect cultural heritage sites in active military zones. This pattern has begun to change, especially as a result of incidents that have occurred during the War on Terror. The Engineer Research and Development Center of the U.S. Army Corps of Engineers is currently designing an interactive map program providing information on possible locations for future military movement and campsites. As part of this project, and in light of the historical friction between military actions and cultural heritage preservation, both cultural anthropologists and archaeologists have contributed information about the locations of sacred sites, heritage landscapes, archaeological remains, and locations of cultural and religious importance. These locations are then noted within the mapping program as areas that are culturally unsuitable for military movement or settlement, similar to areas that would be logistically or environmentally unsuitable. This paper discusses the project and its plans for implementation, in hopes to decouple the historical link between military action and unintentional damaging or destruction of cultural heritage sites, and expand the knowledge base on these issues in the military community.

Fayek, Mostafa [22] see ten Bruggencate, Rachel

Fearn, Sarah [235] see Edinburgh, Marija

Feathers, James (University of Washington), Tristan Carter (McMaster University), Daniel Contreras (Kiel University), Christelle Lahaye (Université Bordeaux-Montaigne) and Katheryn Campeau (McMaster University)
[90] *Luminescence Dating of a Paleolithic Site in the Aegean Islands*

Survey and ongoing excavations at the Stélida chert source and prehistoric stone tool quarry on the island of Naxos in the Aegean have yielded numerous lithic artifacts of Paleolithic and Mesolithic types. One implication is that the Greek islands may have been inhabited prior to the emergence of anatomically modern humans, a conclusion also drawn from a recently discovered site on Crete (Strasser et al JQS 2011). The Naxos site may be older, and its associated corpus of lithic material is vastly larger. Establishing a robust chronology for that material requires a carefully designed absolute dating program that integrates studies of stratigraphy, taphonomy, and lithic typology with context-appropriate deep-time radiometric methods. To this end we have started a program of luminescence dating of sediments from the quarry and surroundings using infrared stimulated luminescence (IRSL) of potassium feldspars. Some initial results are presented.

Feathers, James [86] see Brown, James

Feathers, Valerie (Louisiana State University), Heather McKillop (Louisiana State University), E. Cory Sills (University of Texas at Tyler) and Rachel Watson (Louisiana Division of Archaeology)

[281] *Sea Level Rise at an Inundated Ancient Maya Salt Work: New Information from the Eleanor Betty Site, Paynes Creek National Park, Belize*
Underwater excavations were performed at Eleanor Betty in 2013 to assess sea level rise, map preserved wooden architecture, and investigate the inundated shell midden associated with the site. A total of 39 sediment samples were subjected to loss-on ignition (the burning of sediment to obtain the percent of organic matter present) and microscopically sorted in order to identify and analyze organic and inorganic matter. All samples were high in organic content and contained an abundance of fine red mangrove roots (*Rhizophora mangle*), a proxy for sea level rise. Red mangroves keep pace with sea level rise and fall. Once the rate of sea level rise outpaces the growth of the mangroves, the mangroves stop rising vertically and start to trap leaves and other organic matter, forming detritus and peat. The results of the analyses indicate Eleanor Betty was built on the mangroves and inundated due to sea level rise. Two *R. mangle* samples from the top and bottom layer of the shell midden were submitted for AMS dating in order to date the rate of sea level rise. In this paper, we report on the dates and rate of sea level rise for Eleanor Betty and, by proxy, other salt works in Paynes Creek National Park.

Fecher, Franziska (German Archaeological Institute, Bonn), Markus Reindel (German Archaeological Institute, Bonn, Germany) and Peter Fux (Museum Rietberg Zuerich, Switzerland)

[156] *Interregional Connections of Northeast Honduras during the Postclassic Period*

In 2016, archaeological investigations were carried out in Guadalupe, an extended prehispanic settlement near Trujillo, on the Northeast Coast of Honduras. The site was inhabited during the Postclassic period (Cocal) and might have functioned as a coastal trading center. This is indicated by its strategic location near the coast and next to an ancient river bed connecting the coast to the hinterland, especially to the Valle de Aguán, a culturally and economically important, but hitherto poorly investigated region. A surprisingly high amount of finely worked obsidian blades point to commercial relations with Ixtepeque, Guatemala. Another evidence for long distance trade is the presence of copper bells and conches, which were important trading items during the Postclassic in Mesoamerica. The latter surely were produced in Guadalupe. Further investigations in that poorly studied region of northeast Honduras can surely help to expand our understanding of trading relations during the Postclassic.

Fecher, Franziska [326] see Reindel, Markus

Feder, Kenneth

[212] *This Way to the Sacrificial Table: The Mystification of the Mundane in the Archaeological Record*

In the *Martian Chronicles*, author Ray Bradbury describes the ruins of an ancient Martian city in this way: "Perfect, faultless, in ruins, yes, but perfect, nonetheless." The notion that archaeological sites are perfect, precisely because of an appearance of decay, resides at the center of a worldview in which the archaeological record is inherently mysterious, removed from any connection to the mundane world of hunting camps, farmsteads, and industrial complexes of ordinary human beings. In this alternative perspective, the places where archaeology shows that people conducted the activities that characterized their economic lives, including housing, the storage of vegetables, and the production of soap and apple cider are, instead, the powerful and mysterious remnants of portals to other dimensions, vortexes of earth energies, the houses of fairies and gnomes, beacons for extraterrestrial visitors to Earth, and yes, the altars upon which Celtic virgins were cruelly sacrificed. This paper explores that process of mystification.

Fedick, Scott [280] see Mathews, Jennifer

Fedje, Daryl (Hakai Institute, University of Victoria), Duncan McLaren (Hakai Institute, University of Victoria) and Quentin Mackie (University of Victoria)

[226] *Stemmed Points and "Expedient Stone Tools": Early Post-Glacial Archaeology on the British Columbia Coast*

Over 35 years ago Al Bryan and Ruth Gruhn were promoting the concept of a very early "Stemmed Point Tradition" associated with "simple" flake and core tools. They saw this "Far West" area construct as being of similar age to Clovis and possibly even older. Al and Ruth were keenly interested in the assemblages of stemmed points and "expedient stone tools" recovered by Fedje and others from a series of sites in the Eastern Slopes region of the Canadian Rocky Mountains in the 1980s, an interest Fedje carried on to the BC coast. Over the past decade we have been finding increasingly strong evidence for an early 'Stemmed Point and expedient tool' technology, with many elements in common with Al and Ruth's ideas, at a number of locations along the west coast of British Columbia. This presentation provides a brief synopsis of the results of some of these investigations, including recent work in Haida Gwaii, the central coast and the south coast.

Fedje, Daryl [49] see Lausanne, Alexandra

Fedorova, Natalia [340] see Losey, Robert

Fehrenbach, Shawn and Ben Hammer (PaleoWest Archaeology)

[300] *3D Modeling and Virtual Reality for Condition Assessments and Educational Outreach Tools Documenting Rock Art in Little Petroglyph Canyon, Naval Air Weapons Station China Lake, California*

Aerial photography with unmanned aerial systems (UASs), 3D modeling through photogrammetry, and the development of virtual reality environments are methods that are taking root within the discipline of archaeology. Developments in hardware and software over the past several years have led greater numbers of archaeologists to adopt these methods with more diverse applications. PaleoWest Archaeology, working under contract with our partners at PacArctic for Naval Facilities Engineering Command (NAVFAC) Southwest is using these methods to document one of the densest concentrations of rock art in the New World. Little Petroglyph Canyon is part of the Coso Rock Art District, a National Historic Landmark on the Naval Air Weapons Station base in China Lake, California. 3D modeling using photogrammetry provides a baseline for the development of a GIS-based condition assessment database to be used by Navy archaeologists working on the base, as well as the baseline for two virtual reality outreach tools for academic and general audiences. This poster presents the initial results of our work on this site.

Fehren-Schmitz, Lars (UCSC Anthropology) and Kelly Harkins (UCSC Anthropology)

[143] *The Impact of Climate Dynamics and Cultural Change on the Demography and Population Structure of Precolumbian Populations in the Atacama*

Archaeological studies in the Central Andes have pointed at the temporal coincidence of climatic fluctuations and episodes of cultural transition throughout the precolumbian period. Although most scholars explain the connection between environmental and cultural changes by the impact of climatic alterations on the capacities of the ecosystems inhabited by precolumbian cultures, direct evidence for assumed demographic consequences has been missing so far. Desert margin areas, as we find them at the Andean foothills and along the Pacific coastline of the Atacama are ideal research areas to study the dynamic relationship of climate and demography because they are reactive ecosystems with low resilience. Thus, even minor climatic changes can force these ecosystems into transition potentially altering the ecological conditions for the populations living in them. Here we present a large body of mitochondrial and genome wide genetic data from precolumbian populations living at the fringes of the Atacama. We test demographic models informed by genomic, paleoclimatic, and archaeological data and show that especially in later precolumbian phases climatic changes do coincide with demographic transitions and migration events. We conclude that increasing socioeconomic complexity and agricultural specialization increased the vulnerability of populations living in the desert margin ecosystems of the Atacama.

Fehren-Schmitz, Lars [143] see Harkins, Kelly

Fehren-Schmitz, Lars [245] see Washburn, Eden

Fei, Li

[271] *Ideas of Immortality and the Clay Buddha Image from Yibin, Sichuan, China*

In 2012, the Sichuan Provincial Institute of Archaeology excavated a group of cliff tombs in Nanxi County, Yibin; grave M12 at this site revealed a clay Buddha image. This paper argues that this is the base of an object dating between the late Eastern Han and the Shu Han period (AD 25–263) that is similar to the bases of money trees molded in the shape of a seated Buddha or Queen Mother of the West. The image thus likely developed from the image of the Queen Mother of the West as seen at the base of such objects. Even though the Buddha image from Yibin is rather different from the Buddha images seen on money trees from Sichuan, this paper argues that both images reflect a shared belief in immortal beings. The paper furthermore shows that this image shows local traits that are particular to early Buddha images from southern Sichuan.

Feinman, Gary [199] see Niziolek, Lisa

Felipe Lopez, Aarón (Universidad Veracruzana)

[7] *Petroglyph panel in Tlaltetela, Veracruz, Mexico*

The Rio de los Pescados runs in a mountainous zone of the state of Veracruz, Mexico. The river passes through various ecological zones of varying terrain before emptying into the Gulf of Mexico. Tlaltetela is a small town located on a plateau approximately 60 m above the basin of the Rio de los Pescados in central Veracruz. Approximately 1 km from Tlaltetela, there is a large petroglyph panel on a 7.6 m high by 24.6 m long rock wall in the river basin. There are over 100 elements covering the panel, including 10 anthropomorphic depictions. Other figures appear to represent plants, animals, lightning bolts, and symbols similar to war shields and gods from various eras and cultures. Because of the variety of representations, it is believed the symbols were created over numerous centuries as the site lies along a route used for many years for trade and travel.

Fenech, Katrin [133] see McLaughlin, Rowan

Feng, Yue and Youping Wang (School of Archaeology and Museology, Peking University)

[33] *Lithic Technology and Human Adaptation in Pleistocene Central China*

Nearly half a century ago, Prof. Grahame Clark summarized the five modes of lithic technology in Paleolithic times: Oldowan, Acheulian, Mousterian, Blade and Microblade Techniques. Major areas in the western part of the Old World followed this sequence, however, going east to the Tibetan Plateau and the deserts of Central Asia, China, and East Asia, the core-and-flake and cobble-tool industries persisted majorly throughout the Pleistocene. This paper introduces the new discoveries in the central part of East Asia, mainly focused on findings in Luonan Basin, Shaanxi Province and the eastern areas of Mt. Song in Zhengzhou, Henan Province, China. Based on these new materials, further discussions will be made on the uniqueness and importance of the lithic technology and human adaptation strategy in this region.

Fenn, Thomas (Cal Poly Pomona) and Doug Anderson (Haffenreffer Museum and Brown University)

[387] *Glass Beads and Evidence for Early "Precontact" Trade in Northwestern Alaska*

Exploring early contact between native peoples of Alaska and Eurasian cultures provides important information on the movement of people and materials throughout greater Beringia. Glass trade beads are particularly well suited to explore these relationships, as they were not made locally and high-precision chemical analyses can provide strong evidence to the production origins of the beads. Glass beads were recovered from excavation of a site dating from the late 1700s to early 1800s, just before official contact with non-native explorers, on the Kobuk River near Kiana, northwestern Alaska.

Questions regarding these beads are whether they originated from the west, from or through Asia, or from the Alaskan interior via North American trade from the east. This paper reviews evidence for early glass bead trade into Alaska and presents new chemical analyses of the Kobuk River site. Results suggest Asian and trans-Asian origins for the glass beads. Discussion of the potential trade routes and mechanisms are explored.

Fenn, Thomas [287] see Wang, Qingzhu

Fenoglio, Fiorella (INAH) and Israel Lara Barajas (INAH)

[183] *Evidencias bioarqueológicas de los grupos sedentarios en el semidesierto de Querétaro*

El semidesierto de Querétaro guarda en su interior una gran cantidad de información que nos indica la presencia de grupos sedentarios desde épocas muy tempranas. Ejemplo de ello lo constituye el entierro de Peña Blanca, uno de los contextos más interesantes que se han recuperado en el Estado en los últimos años. Otros hallazgos nos permiten vislumbrar las dinámicas culturales que establecieron estos grupos caracterizados a partir del estudio de sus sistemas de enterramiento, los cuales destacan por una serie de particularidades tanto por la forma en que eran depositados los cuerpos y los objetos asociados a éstos como por los resultados de los análisis realizados para su datación. En esta ponencia daremos a conocer las características generales de los hallazgos y su importancia para la investigación de las sociedades prehispánicas de la región.

Fenoglio, Fiorella [183] see Lara Barajas, Israel

Feranec, Robert [44] see Bryant, Jeff

Ferguson, Jeffrey R. (University of Missouri), Myles Miller (Versar) and Martha Yduarte (Fort Bliss Military Reservation)

[368] *Chemical Characterization and Source Identification of Obsidian Projectile Points in the Southern Southwest*

A sample of over 800 obsidian projectile points collected during 40 years of archaeological survey and excavation on Fort Bliss Military Reservation of south-central New Mexico and western Texas was submitted for chemical characterization and source identification using X-ray fluorescence (XRF). Obsidian projectile points representing all major temporal periods were analyzed, including Paleoindian Folsom points, several forms of dart points produced during the Early, Middle, and Late Archaic Periods, and arrow points of the Ceramic and Protohistoric Periods. Geologic obsidian sources from across the Southwest and northern Mexico and secondary sources along the Rio Grande Valley were identified among the samples and the temporal and geographic distributions of those sources were reviewed. The use of temporally-sensitive projectile points provided a much broader time depth than previous studies of obsidian sources based on groups of samples relating to one or two phases or periods and allowed for changes in territorial mobility ranges during the Archaic Period to be contrasted with shifting social and economic relationships during the Ceramic Period. The analysis provides an unprecedented insight into 8,000 years of prehistoric adaptations, mobility, and social evolution in the northern Chihuahuan Desert of southern New Mexico and Trans-Pecos Texas.

Ferguson, T J [34] see Tosa, Paul

Fernandez, Andrew

[237] *I Know Why the Caged Parrot Squawks: A Distributional Analysis of Casas Grandes Macaw Cage Stones and the Organization of a Ceremonial Industry*

The prehistoric exchange of macaws and their feathers was a ritually charged cultural phenomenon observed across the Southwestern United States and portions of Northern Mexico. Nowhere was the integration of this industry more apparent than at Paquimé, the principal center of the Casas Grandes culture, in present day Northern Chihuahua, Mexico. The residents of Paquimé and some of its outlying community members imported, bred, raised, and ritually sacrificed various species of macaws by the hundreds. A central component of the aviculture program was the development of a ground stone cage door ring and corresponding cage plug. The rings and plugs are found in a variety of forms and finishes, though they are normally referenced as a general artifact type. Using Geographic Information Systems software, the site-wide distribution of the cage stones was evaluated by type and location. My results suggest a division between full-time aviculture specialists and part-time domestic practitioners, based on the preferential use of high-quality finished stones in some areas over others where rough and repurposed stones were adequate.

Fernandez, Andrew [155] see Willhite, Brenton

Fernandez Diaz, Juan C. (University of Houston/NCALM) and Ramesh Shrestha (University of Houston/NCALM)

[131] *Baseline Remote Sensing Survey of the Mayan Biosphere Reserve (MBR) in Petén Guatemala*

The Fundación Patrimonio Cultural y Natural Maya (PACUNAM), a nongovernmental-organization (NGO) from Guatemala, works for the promotion and preservation of cultural and natural patrimony contained within the Mayan Biosphere Reserve (MBR) in the department of Petén in Guatemala. To aid with their preservation and promotion goals, PACUNAM has developed a plan to perform an airborne lidar and hyperspectral survey of nearly 14,000 km² of the MBR and neighboring regions over a three-year period. PACUNAM has contracted the National Science Foundation (NSF) National Center for Airborne Laser Mapping to perform the survey. NCALM started the first phase of the project in July of 2016 and within a period of three weeks mapped approximately 1,700 km² of the reserve with a multispectral lidar. This coverage is spread among 11 macro areas-of-interest, which cover the archaeological sites of Tikal, Holmul, Naachtun, La Corona, El Zotz, El Peru, Waka, Uaxactun, San Bartolo, Xultun, El Tintal, Achiotal, Witzna, and four other critical environmental study regions. This presentation will provide a rationale for this multiyear project as well as cover technical, logistical and scheduling details regarding the completed first phase and upcoming data collection and processing phases.

Fernandez Diaz, Juan C. [320] see Shrestha, Ramesh

Fernandez Souza, Lilia (Universidad Autónoma de Yucatán), Mario Zimmermann (Washington State University) and Socorro Jiménez Álvarez (Universidad Autónoma de Yucatán)

[5] *Food and Foodways at Sihó, Yucatán: Understanding Socioeconomic Diversity*

In the past as in the present, foodways and cuisine have been expressions of identity and status. Different social strata had different access to natural resources and offer a variety of material expressions related to food, preparation and service, from grinding stones to exquisite art works. In Classic

Maya society, some foodstuffs such as cacao, were mentioned and painted in beautiful elite wares, as well as in murals and carvings. At Sihó, Yucatán, archaeological projects developed by the Autonomous University of Yucatán have explored house compounds from different socioeconomic levels, by excavating buildings from range structures to small house foundations. Our results show an important difference in meat consumption between high and middle or low strata, but perhaps surprisingly, there is the presence of cacao in a nonelite compound, showing a complex and rich panorama of food choices. Our goal in this paper is to identify similarities and differences in access to resources and food consumption practices in Sihó's Classic society in order to discuss how these can be related to socio economic stratification and identity. We utilize spot test chemical analysis and starch grain analysis of ceramics and grinding implements from five house compounds to test our hypotheses.

Fernandez Souza, Lilia [349] see Alvarez, Socorro

Fernández-Crespo, Teresa (University of the Basque Country/University of Oxford), Andrea Czermak (University of Oxford), Rick J. Schulting (University of Oxford) and Julia Lee-Thorp (University of Oxford)

[30] *Breastfeeding, Weaning, and Childhood Diet in Cave and Megalithic Populations of Late Neolithic North-Central Spain*

Stable carbon and nitrogen data of adult/adolescent human bone collagen from north-central Spanish Late Neolithic (ca. 3500–2900 cal. BC) provide evidence for the existence of significant isotopic differences among and between communities living in close proximity and burying their dead in caves and megalithic graves. This, together with previously identified distinct funerary selection patterns, suggests an unsuspected complex social or cultural differentiation. The purpose of this paper is to extend the isotopic investigation to infants and young children, in order to determine at what age isotopic/dietary difference appears and if divergences can also be seen in breastfeeding and weaning practices. This may have implications for whether these are two distinct populations, or some other division within society that occurs from a certain age. To this end, stable carbon and nitrogen analyses on infant bone collagen and on high-resolution incremental dentine samples of first permanent molars are conducted, increasing precision in considering weaning chronologies.

Fernandez-Gotz, Manuel (University of Edinburgh)

[324] *Collective Action in Iron Age Europe: Public Assemblies as Arenas for Participatory Government*

Public assemblies were a common phenomenon in Iron Age and Early Medieval Europe. In these large collective meetings, important decisions concerning war, peace, the choice of military leaders, legislation and the administration of justice were taken. Together with their political role, they also fulfilled other simultaneous functions, including religious festivals and the holding of fairs. Once believed to be archaeologically invisible, recent research has identified the remains of a large number of public assembly places within Late Iron Age fortifications. This paper will summarize the archaeological and literary evidence for Iron Age public assemblies, setting them into the wider comparative framework of collective action theory.

[324] *Chair*

Fernandez-Lopez de Pablo, Javier (Institut Català de Paleoeologia Humana i Evolució Social [IPHES]), Mario Gutiérrez-Roig (Institut Català de Paleoeologia Humana i Evolució), Magdalena Gómez-Puche (Institut Català de Paleoeologia Humana i Evolució) and Sergi Lozano (Institut Català de Paleoeologia Humana i Evolució)

[165] *Late Glacial to middle Holocene demographic dynamics in Iberia: a chronological modeling approach*

This paper presents the preliminary results of the research project MULTI-SCALARDEM and our current work in the context of a new ERC supported project: PALEODEM. Both projects aim to reconstruct the population history of the Iberian Peninsula from the Late Magdalenian to the Late Mesolithic (c. 16,000–8000 cal BP), a time framework of major cultural and socioeconomic adaptations to climatic and environmental change. For this presentation, we will focus on the analysis of the radiocarbon record (summed probability distributions approach of calibrated radiocarbon dates) to infer past demographic dynamics. A new georeferenced database of radiocarbon dates has been created ad hoc for this research. In order to critically assess the quality and resolution of the Iberian radiocarbon record, and different filtering criteria and calibration procedures have been implemented. Our analytical approach includes taphonomic bias corrections, non-parametric bootstrapping to test the statistical significance of the observed results and hypothesis testing of different models of demographic growth. Finally, we will discuss general trends and regionally-specific relative population changes in the context of the Late Glacial to middle Holocene climatic variability.

Fernandez-Perez, Natasha (University of Puerto Rico–Río Piedras) and Isabel Rivera-Collazo (University of California–San Diego)

[370] *Beyond Subsistence: Food Consumption in the Military Garrison of San Juan de Puerto Rico from the Eighteenth to Nineteenth Centuries*

This case study explores how food consumption in the military garrison of San Juan de Puerto Rico played a role in the negotiation of status and identities during the Spanish colonial period. Since defense of the territories was the primary task, the military tended to have priority to the access of exotic foodstuffs, such as wheat products. Nevertheless, Puerto Rico was quickly relegated to the margins of the Spanish Empire and legal ships ceased to arrive in a constant mode. Thus, we want to explore if the diet of people that lived and worked in this military garrison consisted of locally available or exotic foods, and if there is variation of this pattern throughout time. To answer this, we conducted an exploratory excavation in the kitchen and latrine of El Castillo San Felipe del Morro and took sediment samples for phytolith analysis. Given that these areas are integral to food preparation and excretion, we can expect both to contain food remains. The results of this analysis will contribute to discussions about the relationship between food and status, and discussions about the negotiation of identities.

Fernandini, Francesca (Stanford University)

[170] *Cerro de Oro and the Year AD 600: Changing Settlement Patterns in the Lower Cañete Valley*

The year AD 600 seems to be an important turning point in the settlement pattern of the lower Cañete valley. While settlements prior to this date tend to be small sized and located close to the river margin, the period after AD 600 shows settlements tend to be placed a few kilometers away from the river margin. The largest of these is Cerro de Oro, a 150 ha densely populated settlement located on top of a mound, 13 km away from the river margin. The construction and use of Cerro de Oro seems to coincide with the creation of an extensive irrigation system as well as a well-managed exploitation of agricultural products at the site. This study will attempt to establish an association between the unprecedented nucleation of people on top of the Cerro de Oro mound, the increase of the agricultural frontier through the installation of a new irrigation system in the lower Cañete valley and the well-documented climatic oscillations that characterized the years circa AD 600.

[170] *Chair*

Ferrari, Giada (Institute of Evolutionary Medicine, University of Zurich), Mathieu F. Robin (IEM/IEU, University of Zurich), Claudia Viganò (IEM, University of Zurich), Michael G. Campana (Smithsonian Conservation Biology Institute) and Christine Grossen (IEU, University of Zurich)

[181] *Reconstruction of Genetic Diversity prior to Recolonization of Nearly Extinct Alpine Ibex (Capra ibex) using Ancient DNA*

Human activity has driven several mammal species close to extinction. The Alpine ibex (*Capra ibex*) suffered a severe bottleneck during the nineteenth century, when overhunting and habitat loss resulted in less than a hundred individuals surviving in the Italian Alps. Since then, the Alpine ibex has been successfully reintroduced across the Alpine ridge. Genetic analyses reveal a low genetic diversity in all extant populations, a common phenomenon in

species that have gone through a recent bottleneck. Historical and zooarchaeological records of the Alpine ibex from the period of the population collapse are sparse. We are therefore using museum and archaeological specimens that predate the human induced bottleneck to address the historical archaeological question of whether the current low diversity was caused by recent human influence or by prior events (e.g., population reductions during the glacial maxima). We are reconstructing complete mitochondrial genomes from skeletal remains of twelve Alpine ibex individuals: six 150- to 300-year-old museum specimens, five individuals found in a cave system in central Switzerland and radiocarbon dated to between 3000 and 8000 years BP, and one sample, likely a hunting trophy, from a Roman settlement in eastern Switzerland dated to around 2000 years BP.

Ferreira Ulguim, Priscilla (Priscilla Ulguim)

[294] *Fire and Death: Cremation as a Ritualized Funerary Practice in the Southern Brazilian Highlands*

Archaeological evidence from southern Jê mound and enclosure complexes in the southern Brazilian highlands points to the development of a complex funerary ritual focused on the practice of cremation from 1000 BP onward. Drawing upon bioarchaeological, ethnographic and ethnohistorical analysis, this paper discusses the role of cremation as a ritualized practice aimed at transforming the dead, their body and their relations with society. Patterns of similarities and differences in such practice are observable in the archaeological record at eleven mound and enclosure complex sites with repeated evidence for cremation and the secondary deposition of cremated remains. These patterns are interpreted as negotiable and nonnegotiable strategic responses to death.

Ferris, Neal (University of Western Ontario)

[18] *Searching for Reflexivity in Digital Archaeology and Heritage*

The general enthusiasm for all things digital applied to archaeological method and research makes teaching a course on digital archaeology tailor-made for the kinds of experiential learning approaches archaeology does so well within the academy. That enthusiasm facilitates an archaeologically creative engagement with digital technologies and information management that, at its best, reimagines the archaeological enterprise and advances stunning new research applications. But what is sometimes lost in all that enthusiasm is a reflexive gaze: just because we can do it (scan, print, share, make accessible online, etc.), should we do it? For what purposes? Is it ever not okay to do "it"? And how do the technologies obfuscate those decisions, or facilitate a wider reflexivity on archaeology and heritage? In this paper I consider my own attempts to balance coming up with a digital archaeology and heritage cross-listed course, while trying to find ways for that class to ponder the reasons why.

[256] *Discussant*

Fertelmes, Craig (Gila River Indian Community)

[335] *Geochemical Evidence for Dispersed Ground Stone Tool Production at Hohokam Villages in the Middle Gila River Valley, Arizona.*

A recent geochemical provenance analysis of Hohokam vesicular basalt grinding tools argued for the nucleated production of trough manos and metates during the Preclassic (AD 500–1100) and Classic (AD 1100–145) periods (Fertelmes 2014). One locus of production was suggested to have been the primary village of Upper Santan, which acquired vesicular basalt from the Santan Mountains and then distributed finished or nearly complete grinding tools to settlements across the Middle Gila River Valley. However, this model of vesicular basalt tool production is rejected in light of new research completed by the Gila River Indian Community—Cultural Resource Management Program (GRIC-CRMP). Additional sampling and geochemical analysis of vesicular basalt from the Santan Mountains has identified two spatially and geochemically distinct source groups. Differential consumption of these two source groups by local settlements indicates that the production of vesicular basalt grinding tools was not concentrated at Upper Santan. Resultantly, it is suggested that Hohokam vesicular basalt groundstone tool production in the Middle Gila River Valley is better characterized as dispersed and also that the nexus of production and distribution was organized at the household level.

Ferworn, Alex [18] see Carter, Michael

Fiehring, Benno (Instituto Nacional de Antropología e Historia) and Hans Martz (Escuela Nacional de Antropología e Historia)

[94] *Symmetry Axis and Its Calendric Properties in Tamtoc, San Luis Potosí: An Archaeoastronomical Approach*

With only scarce information on the topic, we have undertaken an archaeoastronomical investigation in Tamtoc, because we consider that the relations between its architecture and phenomena in the sky constituted an important element for the harmonic integration of its urban space, which probably supported oral discourse in the past. The measurement of the building's orientation in relation to the local horizon, allows us to know the specific calendric dates at which the sun aligns with the axis in question, a fact that contributes important information with respect to the settlements formation. In this paper we present the results of several archaeoastronomical measurements and argue that Mesoamerican calendric intervals have been operated in Tamtoc. It seems to be clear, that pairs of calendric dates (that are part of particular calendric families) as well as commensurate intervals were used to orientate and position buildings and formally integrate the urban center.

Fiehring, Benno [94] see Cordova, Guillermo

Field, Julie (Ohio State University)

[123] *Push and Pull Factors in Inland Settlement*

Archaeological investigation along the coastlines of the islands of the Western Pacific have documented the distinct deposits of human colonizers and their descendants. Recent research has indicated that the first colonists were marine foragers, but also directed their forays into the interiors of islands to collect reptiles, bats, and birds. The research presented here reveals how predictive modeling and directed survey can aid in the detection of post-colonization sites located in the interiors of larger islands, in this case Viti Levu, Fiji. The examination of island interiors as a critical component of colonization can aid in furthering our understanding of ecological change and human population growth and settlement.

[123] *Chair*

Field, Julie [123] see Roos, Christopher

Field, Sean (University of Nebraska-Lincoln) and Carrie Heitman (University of Nebraska-Lincoln)

[301] *Large-Scale Aerial Photogrammetry: A Comparative Case Study of Changes in the Archaeological Landscape surrounding Pueblo Pintado, New Mexico*

In this poster, I explore shifts in the geomorphic landscape surrounding Pueblo Pintado, outside of Chaco Canyon National Cultural Park, New Mexico, in order to assess modern impacts on the ancient road systems which connect Great Houses throughout the Chacoan region. Utilizing high-altitude

aerial imagery gathered by Jacob Smith III, I am working to create a high-resolution, large-scale photogrammetric model surrounding Pueblo Pintado. This model will provide support for geospatial analyses of Chacoan road systems through two avenues: 1) it will aid in identifying the full extent of the Pueblo Pintado to Chaco Canyon road, as well as a smaller connecting road between Pueblo Pintado and the Chacra Face road; and 2) it will act as a more precise model from which higher resolution DTM's and DEM's can be created to service increasingly accurate Least Cost Path Analyses. This model will additionally operate as a comparative dataset to analyze shifts in the geomorphic landscape over a twenty-five year period; juxtaposed against modern high resolution aerial imagery supplied by a NASA DEVELOP project. Lastly, I discuss the effect of modern land easement and natural resource permits on the archaeological landscape of the area as well as future research implications.

Figol, Timothy [21] see Malainey, Mary

Figueroa, Valentina [62] see Horta, Helena

Filini, Agapi (El Colegio de Michoacán)

[288] *The Butterfly-Solar Complex in West Mexico: Information Transmittal and Design Structure*

During the Classic period, butterfly motifs encountered throughout Mesoamerica are indicative of diverse kinds of interaction with the city of Teotihuacán. Highly standardized stuccoed and painted ceramics from the lacustrine region of Michoacán, West Mexico, were used as the principal medium to project a major iconographic theme: the Butterfly-Solar Complex, which was very likely related to a Teotihuacán solar militaristic ideology. Symbolic meanings were encoded in symmetrical panels which adhered to the norm of quadripartition and the use of a specific color code with a definite structural value. It is suggested that design structure prevailed in the process of information transmittal whereas design elements were of lesser importance for the reproduction of these vessels.

[288] *Chair*

Filipovich, Dragan

[267] *Inferring Markets from Material Remains: Hirth's Distributional Approach in the Light of Economic Theory*

Hirth 1998 proposed identifying archaeologically the operation of markets in ancient societies by looking at the distribution patterns of selected objects across households of different types. This paper revisits critically this so called distributional approach and argues that it essentially amounts to a (failed) attempt at "estimating" a (say, Classic Maya) market demand from archaeologically recovered consumption data. Such an undertaking, besides facing considerable identification problems which Hirth 1998 does not seem to be aware of, suffers from the fact that the diagnostic feature on which it focuses (constant levels of, or expenditure shares on, certain items) is surely not an appropriate test for the presence of markets. As an alternative, a more robust 'linkage' test, still based on looking at the material implications of households' decisions, and inspired by the empirical literature that tests for separation in rural household-producers' environments, is briefly outlined.

Fillios, Melanie (University of New England)

[85] *Yikes, No Comparative Collection! Can 3D Imaging Produce Robust Faunal Identifications?*

Most zooarchaeologists are familiar with the uncertain feeling when faced with identifying material in the absence of a physical comparative collection. In response to this challenge, numerous photographic atlases have been produced to provide researchers with access to collections while in the field. Unfortunately, 2D images are constrained by their inability to be "handled" and measured in the same way as a physical specimen. The UNE Archaeology virtual bone project was initially developed as a pedagogical tool to teach distance students faunal analysis in an online environment. Human and animal bones were scanned to generate easily accessible 3D models that could be "handled" and measured. Given our field is predicated first and foremost on physical specimen ID—we received quite a few skeptical looks for this approach. In this talk, we present our virtual bone project and test its ability to facilitate robust identification of osteoarchaeological remains. We compare the ability of students trained the traditional, hands-on way to those trained in the virtual classroom, to accurately identify material from an archaeological faunal assemblage. We then present the identification results of several 'experienced' zooarchaeologists using the tool—and the results just may surprise you.

Fillo, Laura (Museo Nacional de Antropología) and María Olvido Moreno-Guzmán (IIE-UNAM)

[225] *How Many Birds Does It Take to Make a Feathered Shield? The Resources and Techniques of Mexica Featherworkers*

The Florentine Codex is an excellent source for understanding the manufacturing techniques used by Mexica featherworkers to make luxury items. It records many of the tools and steps necessary to tie feathers and produce multicolor mosaics. Historical information about the selection of the raw materials, their storage, preparation, and handling, however, is scarce. The meticulous study of two Mexica feathered shields has allowed us to understand, not only the materials used in their manufacture, but also to estimate the number of feathers required to make these objects. This presentation will examine the resources and techniques employed by featherworkers in the capital of the Mexica Empire.

Finkelstein, Aviva (Kleanza Consulting), Wayne Point (Musqueam Indian Band) and Ben Jun (Junebee Pacific Developments Inc.)

[17] *Developing Dialogue: A Developer, First Nation Band Member, and Archaeologist Discuss the Role of Meaningful Consultation in CRM*

As stated in the SAA's Principles of Archaeological Ethics, "Responsible archaeological research [requires a commitment to] consult actively with affected group(s), with the goal of establishing a working relationship that can be beneficial to all parties involved." In the context of professional consulting archaeology, meaningful consultation with descendant communities is often held as a primary goal. However, CRM archaeologists are faced with developers' timelines and budgets, which can preclude anything more than superficial consultation. In British Columbia, consultation with First Nations is mandated by the Province, and most developers see liaison and communication with First Nations as a necessary step. Unfortunately, First Nations involvement in projects rarely exceeds the opportunity to employ local field assistants and for First Nations governments to comment on findings. Rarely are design plans developed in conjunction with and in true collaboration with First Nations. This paper, presented by a Vancouver-based residential developer; a member of the First Nation most affected by development; and the archaeological firm contracted for the development, offers a new model for truly collaborative consulting archaeology. True and meaningful inclusion of descendant communities in development and design plans is more than routine "consultation"; we argue that it is good business practice.

Finlay, Nyree

[100] *The Avocational Atelier: A Portrait of Lithic Collection Practice*

Adapting contemporary archaeological techniques used in the recovery of Francis Bacon's Reece Mews studio, this project documents the collecting practice of an avocational lithic fieldworker on the Isle of Arran, Scotland, who assembled a substantial heritage archive including significant archaeological objects, prehistoric assemblages and geological specimens. Treating her abandoned artifact analysis table and intact workrooms as sites

it used traditional and multimedia techniques to record her working environment and explore modes of engagement and analytical methodologies. It presents a rare opportunity to capture in situ work practices to produce an intimate life-course portrait of a female collector that also offers broader comparative insights into twentieth-twenty-first century collaborative recreational research activity. In addition, intergenerational and entangled networks and issues around object divestment are explored with a view to anticipating future ancestral legacies and needs in light of Scottish national strategies promoting wider heritage participation.

Finnegan, Patrick [195] see Wiley, Taylor

Fiore, Danae [62] see Franco, Nora V.

Fischer, Christian (Cotsen Institute of Archaeology, UCLA) and Mitch Hendrickson (University of Illinois, Chicago)

[29] *Finding Buddha: Hi-Tech Approach to the Study of Buddhist Transition at the Angkorian Center of Preah Khan of Kompong Svay, Cambodia (Tenth to Sixteenth Centuries CE)*

The Two Buddhist Towers Project seeks to identify material culture evidence of the important shift from Mahayana to Theravada Buddhism during the decline of the Angkorian Khmer Empire. At the regional center of Preah Khan of Kompong Svay, also known as Bakan, the most representative iconography, found for example at the Tower of Preah Thkol and the temple of Prasat Stoeng, shows the religious foundations of Mahayana Buddhism, which was probably practiced at the site since its inception. On the other hand, Theravadin evidence is scarce and best exemplified by the tower of the four-faced standing Buddha of Preah Chatumukh and the numerous recarved lintels depicting five meditating Buddhas. The difficulties encountered in finding and studying remains of this religious change using traditional methods has prompted the adoption of new technologies for this inquiry, including lidar, drone photography, 3D photogrammetry and field spectroscopy. In this paper, we present initial results and discuss challenges and issues related to the application of these techniques at Preah Khan of Kompong Svay.

Fish, Paul (Arizona State Museum)

[335] *Visiting a "Villagescape": The Early Classic Period Marana Mound Site*

We explore Early Classic Period Hohokam society through the medium of inhabitants' lives in the center with a platform mound and over 40 residential compounds in the northern Tucson Basin. We approach the topic as a retrospective based on 30 years of intermittent mapping and excavation at the Marana Mound Site, coupled with insights from advancing Hohokam studies. We ask how the spatial and architectural configuration or "villagescape" of this center reflected and embodied the principles of communal and regional organization at this time and place. Envisioning the experiential backdrop of the Early Classic Period reveals the partitioned nature of domestic and public space in which pervasive compound walls segmented both societal domains with physical and symbolic barriers. How did compound dwellers come together and establish collective identities as new social entities? We identify patterns of differentiation within and between compounds and in mound precincts, especially considering evidence that might pertain to the identity and whereabouts of the elusive emergent elites long attributed to the Classic Period. We discuss the developmental trajectory of the center from initial settlement to the cessation of residential occupation and subsequent revisitation.

[84] *Discussant*

Fish, Paul [335] see Fish, Suzanne

Fish, Suzanne (Univ. of Arizona) and Paul Fish (Univ. of Arizona)

[335] *Tucson Platform Mounds in the Context of Classic Period Variability*

The variability among Hohokam platform mounds and their related architectural complexes, the predominant form of public architecture during the Classic period, has now been well documented through ongoing field studies and archival research. Recognition of that variability encompasses multiple dimensions linked to perceptions of leadership, social structure, territorial configurations, civic and ritual affairs, and external relationships. The Tucson regional sector in southern Arizona is no exception, with platform mounds mirroring much of the diversity seen in the greater Hohokam domain. As elsewhere, untangling the expressions and sources of Tucson variability is challenging due to incomplete data and poorly understood factors such as chronological tendencies and intraregional stylistic spheres. We begin with mound complex attributes and developmental histories at two Tucson Classic centers where we have worked, one restricted to the Early Classic period and a second occupied from Early through Late Classic times. We then examine these two cases against a backdrop of broader variability at local through region-wide scales in order to strengthen insights into the roles of these iconic precincts in Classic period Hohokam society.

Fisher, Abigail (Southern Methodist University)

[340] *Methods for the Identification of Dog and Dog/Wolf Hybrids from Wild Canids in the Northern Plains*

In Native North America, dogs (*Canis familiaris*) were an important resource, used for traction, food, security, and ritual. Given their ubiquity in settlements and their tendency to consume human food waste, dog's remains can provide significant information about past human diet. Stable carbon isotope ($\delta^{13}\text{C}$) ratios may be used to reconstruct maize consumption, while nitrogen ($\delta^{15}\text{N}$) isotope ratios increase by trophic level, and can be used to differentiate between marine, freshwater, and terrestrial inputs. Studies comparing human and dog $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ indicate general uniformity, showing that domestic dogs may be used as proxies for human diet, specifically when addressing maize production. Yet the archaeological identification of dogs is complicated by their hybridization with wild wolves (*Canis lupus*). Furthermore, in the northern Plains, both wild and domestic canids were used for different purposes by people. By combining qualitative and quantitative zooarchaeological analyses, geometric morphometrics, and molecular analyses, this research presents a method for using two independent lines of evidence for the differentiation of wild and domestic/semi-domestic canids at agricultural sites along the Middle Missouri in North Dakota.

Fisher, Chelsea (University of Michigan)

[329] *Integrating Generations on the Formative Maya Landscape: Households and Communities at Tzacauil*

Many Maya centers owe their longevity to the long-term persistence of their households, which were integrated as continuous social units throughout multiple generations. Yet how did the integration of the multigenerational Maya household first emerge? I address this question through the lens of the early farming village of Tzacauil, Yucatán, Mexico. In the Late Formative period (250 BC–AD 250)—the era in which Tzacauil was occupied and abandoned—people in the Maya area began using stone to construct their houses. Houses could outlive their builders for the first time in Maya history. This investment in permanence was tied to increased reliance on gardening and agriculture, and with it, a growing commitment to improving and claiming the landscape over multiple generations. In this paper I discuss the early integration—and later disintegration—of multigenerational households using data collected from house group excavations, lidar, and survey at Tzacauil. Three aims of this paper are: 1) to interpret differences in Tzacauil

house groups' spatial organization as variable investment in multigenerational integration; 2) to move beyond physical houses to address how entire landscapes were integrated by household efforts; and 3) to question why the Tzacaul community ultimately disintegrated.

[329] Chair

Fisher, Christopher T. (Colorado State University) and Michelle Elliott (University of Paris, 1 Panthéon-Sorbonne)

[251] *The Environmental Conquest of West Mexico: The Lake Pátzcuaro and Malpaso Valley Case Studies*

Though the next century will bring great environmental challenges the impact of global warming pales in comparison to the dramatic environmental changes associated with European Colonialism, beginning in the late fifteenth century. Chief among them is the Conquest of the Americas involving the breakdown of millennial-aged systems of land engineering and tenure, compounded by depopulation, and the introduction of the Euro-agro suite. Throughout Central Mexico the initial century of Conquest Europeanized the landscape limiting subsequent land use to an adapted Mediterranean-style system of extensive agriculture and pastoralism. Here we explore the environmental implications of these changes—pre- and post-conquest—for two disparate regions of Mesoamerica, the Lake Pátzcuaro Basin, Michoacán, and the Malpaso Valley, Zacatecas. I will also demonstrate how the Postcolonial and modern landscape are products of this critical transition, and suggest future implications for conservation and global change.

Fisher, Erich (Arizona State University), Jamie Hodgkins (University of Colorado Denver) and Curtis Marean (Arizona State University)

[85] *An Updated GIS-Based System for Calculating MNE and Quantifying Bone Surface Modification Frequencies and Spatial Location on Skeletal Elements in Faunal Assemblages*

Zooarchaeology continues to suffer methodological problems in that analysts use methods for calculating skeletal element and surface modification abundance that vary widely, are non-transparent, and almost certainly produce data that is not comparable across analysts. In 2001, Marean, Abe, Nilssen, and Stone presented a method to overcome these problems by using a GIS-based approach to calculate minimum numbers of skeletal elements (MNE) and surface modification frequencies corrected for preserved surface area. That software was designed in ESRI ArcView and has been widely used and cited. Here, we present an improved and expanded version of their methodology that now runs with ESRI ArcGIS 10.x software. This new software package, which will be available freely, is called "Faunalyze 2.1," and it implements the open-sourced Python 3.4 computing language, which is native to ArcGIS geoprocessing. We will also provide an overview of the program architecture as well as a brief example of the software in use.

Fisher, Jacob (California State University, Sacramento)

[251] *Demographic Collapse and Deintensification in Protohistoric Alta California*

Decreased human population densities associated with European exploration and colonialism in western North America may explain the historic observations of bountiful game that contrasts so drastically with the archaeological record on resource intensification. At Kathy's Rockshelter in the northern Sierra Nevada foothills, California, there is a clear prehistoric trend toward resource depression of artiodactyls and increased dependence on small mammals, freshwater mussels, geophytes, and other higher cost resources. A reversal of this trend corresponds with the initial European exploration of the California coast in the sixteenth century. This suggests that interior Native Californian populations were impacted by epidemics spreading in advance of direct contact in the nineteenth century. When human population densities declined significantly, the relaxation of hunting pressures allowed for an increase in large game populations to historic baseline levels.

[251] Chair

Fisher, John

[97] *On-Site Public Interpretation of Bison Kill Sites*

Translating professional archaeological research into meaningful educational experiences for the public has taken on increased urgency in recent years. Several archaeologically investigated ancient bison kill sites in North America, located in Alberta, Saskatchewan, Montana, Wyoming, Nebraska, and Texas, have an on-site public interpretive facility. The experiences at seven of these sites in moving from archaeological research to developing a public interpretive center are chronicled in a recently published book entitled *Pisskan: Interpreting First Peoples Bison Kills at Heritage Parks* (edited by Leslie B. Davis and John W. Fisher Jr., University of Utah Press, 2016). Each case study followed its own unique path. Shared perceptions come through on certain issues pertaining to public education. These includes the importance of conveying to the public that archaeological method and theory change through time, and that the same body of evidence is open to alternative interpretations. Debate among archaeologists is healthy and engenders advances in knowledge and understanding. This presentation conveys perspectives of archaeologists who have been deeply involved in public education at on-site interpretive centers.

Fisher, Kevin (University of British Columbia)

[312] *Discussant*

Fisher, Lynn [90] see Harris, Susan

Fisher, Philip (Washington State University)

[257] *Late Pleistocene and Early Holocene Alaska: Placing Archaeological Data on Projected Paleoeological Landscapes*

Understanding ecological responses to climate change are essential before inferences can be made regarding past culture change and human adaptation to the environment. This study focuses on modeling the paleoecology of central Alaska at the Pleistocene-Holocene Transition using predictive modeling. Quadratic Discriminant Analysis is used to determine which modern climate variables, including minimum and maximum temperature and precipitation, as well as topographic data, best predict modern vegetation land coverage. This method is then applied to the Pleistocene-Holocene Transition in Alaska to predict and project the boundaries of ancient plant communities by altering the climate variables to estimates based on proxy data. This study focuses on three climatically defined chronozones: the Bølling-Allerød interstadial, the Younger Dryas stadial, and the Holocene Thermal Maximum. The purpose of this study is twofold: 1) to use predictive modeling to assess the sensitivity of central Alaska's ecology at the Pleistocene-Holocene Transition to climate change and to infer what these ecological shifts entailed; and 2) to examine how changes in the lithic technological organization at archaeological sites comprised of the Nenana and Denali artifact complexes correlate to areas with predicted ecological perturbations.

Fisk, Shera (Simon Fraser University), Laure Spake (Simon Fraser University), Luisa Marinho (Simon Fraser University), Ellie Gooderham (Simon Fraser University) and Hugo Cardoso (Simon Fraser University)

[258] *The Use of Dental and Skeletal Indicators to Predict the Age of Menarche from Juvenile Human Skeletal Remains*

The onset of puberty, characterized by menarche in females, marks the important transition from the juvenile to the adolescent life-history stage. Limited research has been done to investigate the relationship between this transition and indicators of skeletal and dental maturation. This study examines the association between age of menarche and stages of skeletal and dental development seen in radiographs of the hand/wrist and dentition, using a sample of 33 females followed longitudinally in the University of Montreal Growth Study. Correlation analysis was used to test the relationship between the age of menarche and the skeletal/dental maturation stages assigned to eight teeth as well as the bones in the hand/wrist. Maturation of the ulna and PM2 provided the strongest relationships with age of menarche. Regression analysis showed that combining these two indicators strengthens that relationship, with the PM2 as the strongest predictor of age at menarche. These findings can provide a reliable method for estimating the age of menarche in skeletal remains, providing insight into the reproductive life span, social and nutritional status of past populations.

Fisk, Shera [235] see Marinho, Luisa

Fitzgerald, Curran [305] see Henderson, Cory A.

Fitzhugh, Ben (University of Washington), Hiroko Ono (Hokkaido University), Tetsuya Amano (Hokkaido University Museum [retired]), John Krigbaum (University of Florida Gainesville) and George Kamenov (University of Florida Gainesville)

[144] *Migration and Isolation in the Okhotsk Tradition of Hokkaido and the Kuril Islands*

Northern people are known for epic migrations such as the Pleistocene colonization of Eurasian Arctic and Movement into North America as well as multiple migration episodes across the North American Arctic in the late Holocene. In this paper we look at the subarctic Sea of Okhotsk region and patterns of mobility within the Okhotsk tradition from 500–1300 CE. Using lead (Pb) and strontium (Sr) isotopes, we reveal unexpected differences in lifetime stationary residence vs. relocation of “Okhotsk” individuals in different times and locations. We report difference between regions and time periods in local vs. nonlocal residence, including an unexpected long-distance migration of numerous individuals to Hokkaido from the NE Asian mainland sometime between the seventh and tenth centuries. From this research, we see a complex picture emerging of heterogeneous demographics, asymmetric connectivity and isolation during this interval. This evidence is considered in the context of broader patterns of social interaction and mobility in Northeast Asia and the Bering Strait region at approximately the same time.

[148] *Discussant*

Fitzhugh, Ben [144] see Miller, Hollis

Fitzhugh, William

[144] *Discussant*

Fitzpatrick, Justin (Central Washington University)

[343] *Faunal Analysis of the Mesa 12 Site, Central Columbia Basin*

From 1973–1975, William C. Smith of Central Washington State College led the “Mesa Project” excavating four sites on the Columbia Plateau in Grant County, Washington. These mesas are small isolated basalt buttes, 100 or more feet above the surrounding scabland channels, with cultural materials on the top and base. They are hypothesized to be defensive sites. Faunal material recovered from these sites has been in storage unanalyzed for over 40 years. The largest excavation was at Mesa 12 where 33 units were excavated. Six radiocarbon dates indicate a Cayuse Phase (2070±90 BP until 565±80 BP) occupation. This thesis is to analyze the approximately 4,500 faunal remains from the site. Preliminary results indicate the presence of suckers/minnows, turtle, rodents, rabbits, and artiodactyls including pronghorn and sheep. The faunal distribution compiled in this thesis will be compared to other regional coulee and Columbia River sites.

Fitzpatrick, Scott M. (University of Oregon), Matthew Napolitano (University of Oregon) and Elliot Blair (University of Alabama)

[302] *X-ray Fluorescence (XRF) and Morphological Analysis of Trade Beads from Palau, Micronesia*

Glass beads have long played an important role in Micronesian societies. Oral histories and ethnographic accounts describe how clay and glass beads (“udoud”) in Palau functioned as traditional forms of currency in exchange relationships and were apparently used by islanders from Yap several hundred miles away to negotiate access to limestone quarries that enabled them to carve their famous stone money disks (“rai”). Evidence shows that both stone money quarrying and the exchange of high-valued items such as beads increased after European contact. In this study, we have conducted the first compositional analysis of glass beads from Palau, which were recovered at the multicomponent site of Chelechol ra Orrak. X-ray fluorescence spectrometry (XRF) and morphological analyses indicate that the beads were manufactured in both Europe and Asia and date to the mid-nineteenth century. Detailed examination of several dozen of these beads not only provides insight into Yapese-Palauan interactions at the time of European contact, but helps anchor activities at the site with much greater chronological resolution.

Fitzpatrick, Scott M. [32] see O'Connor, John

Fitzsimmons, James

[125] *Painted Pots and Royal Routes: Hieroglyphic and Ceramic Traditions in the Western Petén*

The cities of the western Petén shared a common history and several ceramic traditions. In the northwest along the San Pedro Martir River, archaeological sites like El Peru (Waka'), Zapote Bobal (Hiix Witz), La Joyanca, and La Florida (Namaan) flourished with seemingly few—if any—clashes between them for the entirety of the Classic Period. That being said, we know that this region was greatly affected by the Tikal-Calakmul wars. There was even a “road” or route between the sites allied to the “Snake” kings that ran right through this region, ostensibly through El Peru and Zapote Bobal; indeed this route was one of the keys to their dominance in the Maya area during the seventh and early eighth centuries AD. It seems plausible to suggest that the bonds between the local communities here, with their shared traditions and apparently peaceful relations, may have formed in opposition to these larger geopolitical events. This paper will explore what we know from the hieroglyphic record and how it accords with the ceramic evidence for mutual cooperation in the western Petén.

Flad, Rowan (Harvard University)

[76] *Large Walled Sites on the Chengdu Plain, Sichuan, China: Shifting Centers of Regional Emphasis*

In the third millennium BC, several walled sites were inhabited in the Chengdu Plain of Sichuan, China. These late Neolithic settlements varied in size and shape, and they had mounded earth walls, some encompassing the largest areas of any known sites of their time in China. The site of Baodun is the largest known example, and has recently been the focus of extensive excavations. Other known sites in the region include Gucheng in Pi Xian County, the most completely preserved of these walled sites, and Sanxingdui, which became a central settlement of the Bronze Age Sanxingdui Culture following the late Neolithic Baodun Culture. This talk examines the cultural and social context of these large walled sites and discusses landscape and settlement pattern changes during the transition from the Neolithic to Bronze Age periods in the region.

[26] *Discussant*

Fladd, Samantha (University of Arizona, University of Cincinnati), Claire Barker (Arizona State Museum), E. Charles Adams (Arizona State Museum) and Dwight Honyouti (University of Arizona)

[34] *To and from Hopi: Negotiating Identity through Migration, Coalescence, and Closure at the Homol'ovi Settlement Cluster*

The Homol'ovi Settlement Cluster (HSC) holds a significant place in Hopi history as a source of immigrants and a destination for emigrants. In addition to representing an important location along the migration route for groups from the South and East, these villages also housed people who temporarily emigrated from the Hopi mesas. As such, the HSC provides a unique perspective on the processes of population and social movement that contributed to the current form of Hopi society. Using the material record and ethnographic accounts, we examine the complex and multifaceted negotiations of identities that occurred within these villages. These negotiations began as immigrants arrived and established new villages in the region, and continued through the processes of coalescence and the final practices of closure that marked the end of occupation around 1400. We address the diversity of groups that persisted at the HSC through the expressions of passive and active identity in artifacts, such as ceramics, and practices of deposition and closure in order to highlight the accumulation, flexibility, and persistence of social identities that define Hopi people past and present.

Fladd, Samantha [192] see Bishop, Katelyn

Fladeboe, Randee (University of Florida)

[181] *Plucked Macaws: Evidence of Regular Feather Harvesting at Chaco Canyon*

Macaws are not native to the American Southwest, but were imported into this region from central Mexico for hundreds of years. Recent research has demonstrated that the wing feathers of Southwestern turkeys were regularly plucked, as evidenced by significant scarring on the birds' ulnae. This paper provides a macroscopic analysis of macaw skeletal remains from Pueblo Bonito and Pueblo Arroyo in Chaco Canyon, New Mexico, and argues that these elements also show evidence of a practice of regular feather harvesting from live macaws. This information lends insight into the husbandry practices of macaws in the prehistoric Southwest, and aids in reconstructing the life histories of both the transplanted macaws and the humans that supported and utilized them.

Flanigan, Darcie [83] see King, Eleanor

Flas, Damien [389] see Zwyns, Nicolas

Flegenheimer, Nora (CONICET-Área Arqueología y Antropología, Museo de Ciencias Naturales, Necochea) and Roxana Cattáneo (IDACOR-CONICET, Universidad Nacional de Córdoba)

[226] *Discussing Early Societies Fishtail Points and Early Social Practices Seen from the Southern Cone*

The early peopling of South America is related to great environmental and material variability. Discussions must deal with early archaeological records including a variety of lithic assemblages in tropical lands, the Pacific coast, the Andes and the extensive southern plains and plateaus. In this context, fishtails are the most widespread point type exhibiting a dispersed pattern throughout most of South America during terminal Pleistocene times. They are therefore useful to think about with respect to situated social practices of the people who made and used them. Some practices related to these early settlers were identified throughout the southern cone including a very selective choice of raw materials and of landscapes. Point manufacture is described as sequential both in the Pampas and Patagonia reinforcing the existence of similarities in distant regions. Through the detailed study of manufacturing reduction events and of flakes we propose that some production choices conform a corpus shared in a very large area and are independent of local environmental circumstances. This situation is adequate to assess how these shared practices could have constituted traditional memories which were socially incorporated and transmitted, providing a sense of meaning among dispersed groups settling into a mostly empty landscape.

Fleming, Lacey (University of Alberta) and Robert Losey (University of Alberta)

[35] *Application of the Canine Surrogacy Approach to Holocene and Iron Age Sites in Siberia*

Humans and dogs have been living together for thousands of years, participating in various forms of relationships. One of these relationships involves the partial or complete provisioning of dogs by humans. Because of these practices, it has been argued that a dog's diet should generally resemble that of the humans with whom it lived. This proposed interspecies dietary similarity has been an important aspect of some archaeological studies in that dog stable isotope values are in many cases used as direct proxies for human values. This perspective is known as the Canine Surrogacy Approach (CSA). In this paper, we explore the applicability of the CSA using dietary stable isotope data from Holocene coastal sites in Primorye, and from a large assemblage from the Iron Age Ust'-Polui site in the Siberian Arctic, both in the Russian Federation. The Primorye dogs were living in hunter-gatherer societies and feudal kingdoms, and likely were both working animals and human food resources. At Ust'-Polui, foragers' dogs were sometimes butchered, but also occasionally sacrificed and carefully buried. We compare dog dietary stable isotope data to that of local humans at both locations to assess use of the CSA and to better understand dog provisioning strategies.

Fletcher, Beatrice (McMaster University), Aubrey Cannon (McMaster University) and Eduard Reinhardt (McMaster University)

[22] *Exploring the Archaeological Applications of ITRAX XRF Soil Analysis in Southern Ontario*

Prehistoric human occupation in Southern Ontario, Canada spans the gamut of ephemeral hunter-gatherer usage to intensive Iroquoian village settlements. ITRAX core scanning has the capacity to explore some of this rich history. Initially developed for environmental core analysis, ITRAX technology can highlight differences in culturally generated chemical signatures between intensive and ephemeral occupations. This automated, nondestructive X-ray fluorescence (XRF) analysis has the potential to contribute to site prospection techniques, investigations of landscape use, and challenges to site-centric notions of archaeology. This paper presents an initial evaluation of the utility of ITRAX core scanning in archaeological applications. It compares soil cores and bulk soil samples taken from a variety of contexts in Southern Ontario including locations of palimpsest hunter-

gatherer occupations and Iroquoian village sites. Comparisons with the results of phosphorous colorimeter and micro-debitage analyses show the capacity for XRF analysis to corroborate and enhance other forms of intensive small-scale analysis.

Fletcher, Roland (University of Sydney)

[20] *Here There Be Dragons: Trajectories and the Classification of Settlements*

Urban as a label is a problem. This was recognized by Childe and Adams and is re-iterated in the twenty-first century. Varied definitions apply in different regions, some huge settlements are excluded—apparently arbitrarily, others go in and out of “urban” fashion. Concurrently, the term “urban” has huge cachet, providing social dignity, national respect and access to research funds. The news media rarely refer to “The Lost Village” with awe. The conundrum is that while western European languages generally use a tripartite size and status classification such as camp, village and town/city to organize all settlements, other languages use many other terms with different meanings and associations. Plainly the term—urban—is not inherently a true or natural classification. The persistent default on to “urban” would not matter if the phenomena being referred to did not matter—but they do. And if the term is inconsistently spread across divergent trajectories of settlement growth with different magnitudes, rates of growth and outcomes then while local analytic inquiry might be unaffected, the capacity to ask and answer the globally consistent questions which are implied by the label will require either new terms or careful differentiation of terms.

[76] *Discussant*

Flexner, James (University of Sydney)

[168] *400 Years of History and Cross-Cultural Interactions in a Ritually Mounded Landscape of South Tanna, Vanuatu*

A mounded landscape in south Vanuatu provides archaeological evidence relating to chiefly performance, voyaging, and ritual transformation during a period of cross-cultural contacts spanning 400 years or more. The site of Kwaraka is located at the southern end of Tanna Island. The area has a view on clear days of the neighboring islands Futuna and Aniwa, and there is ethnohistoric evidence of long-term patterns of interaction between Tannese people and the people of these nearby islands. Kwaraka is somewhat unique on Tanna for its large-scale stone constructions, which are rare elsewhere on the island, though common on Futuna and Aneityum. The site is also notable as the location where the first Christian missionaries, recent Samoan converts settled in the 1850s. This arrival brought about a new wave of mound construction, this time in the form of house mounds built by the ritual specialists. The Kwaraka mounds provide interesting material for thinking about long-term patterns of communal rituals, including feasting, exchange, and magical practices on Tanna.

[168] *Chair*

Flood, Rory [133] see McLaughlin, Rowan

Flores, Jorge

[45] *Yumbos and the Construction of Their Cultural Landscape*

Archaeology as an academic practice in the northern Ecuadorian Andes has concentrated on a constant exploration of hypothesis about the past with the intention to acquire better and more accurate understanding about the origins and development of complex societies. Since the 1970s, scholars have produced valuable outcomes directed to those goals analyzing evidences concerning to the dynamism of Prehispanic societies in terms of regional distribution, social relations, environmental constraints, ideology, and political organization. The presence of nucleated and disperse patterns of mounds have fostered diverse debates about their origin, function, cultural affiliation, significance for social and political organization, and economic implications. However, conclusions remain obscure due to several factors, including conflicting theoretical perspectives, and the absence of complementary research projects in the region that contribute to the debate about the nature of those monumental constructions. The present research seeks to emphasize the comparative analysis of mounds distribution between the northern highlands Palmitopamba and Tulipe regions. This analysis will consider space and landscape intimately related to the formation of social relationships and the negotiation of social dynamics. The creation of this cultural landscape will be considered as a modification process that molds or influences future human actions.

Flores Esquivel, Fernando C. Atasta and Alejandro Uriarte Torres (DEA-INAH)

[337] *Preclassic Platforms at Yaxnohcah: Central Eminences for a Multinucleated Site*

Yaxnohcah is an important Maya settlement in the southern Campeche lowlands, which, according to what present evidence suggests, had its main civic development during the Middle and Late Preclassic periods. The city's layout includes some features that are specific to Yaxnohcah, as well as others shared with nearby and distant centers. One of central features of the Yaxnohcah settlement, which it shares with other sites, has been described as “clustered nucleation” or “dismembered” pattern for neighboring Southern Quintana Roo region. During the Preclassic at Yaxnohcah, this type of settlement pattern centered around huge terraces and building platforms, with an acropolis-like form. In this paper, we will examine the formal and architectonic characteristics and construction sequences of Yaxnohcah's early civic complexes. In addition, we will analyze their placement in the landscape and the spatial relationships between groups. Finally, we will address the possible meanings of those characteristics.

Flores Ramirez, Rosa Maria (ANTROPOLOGA FISICA)

[183] *Análisis Bioarqueológico de los Restos Óseos Recuperados en “El Tropol,” Colima*

Dos cementerios no contemporáneos fueron parcialmente excavados en el sitio El Tropol, Villa de Álvarez, Colima, en 2004. En el cementerio correspondiente a la Fase Comala fueron excavados seis entierros, mientras que en aquel de la Fase Armería fueron excavados 23 entierros, uno de ellos doble. Además fue excavado un solitario entierro de la Fase Chanal. Los restos de los 31 individuos fueron estudiados bioarqueológicamente, buscando determinar edad, sexo, características físicas, estado de salud (patologías, traumatismos), modificaciones culturales como la deformación craneana y huellas de actividades físicas. Además se reconstruyeron prácticas funerarias de las fases Comala y Armería de Colima. Los resultados de este análisis, dentro del contexto social, cultural, económico y político de las fases Comala y Armería de Colima, nos permiten conocer y comparar datos relativos a la estratificación social, cuestiones de género, actividades ocupacionales y costumbres funerarias de estas sociedades pasadas.

[183] *Chair*

Flores Ramirez, Rosa Maria [183] see Ortega, Allan

Flynn, Erin (PAL)

[16] *What Makes a Home? Searching for Wetus in Archaic New England*

Archaic Period dwellings have largely gone unnoticed in New England due to poor preservation and thousands of years of bioturbation. However, a concentration of post molds, large and small pits, and fire hearths uncovered at the Halls Swamp Site in southeastern Massachusetts are attributes that

characterize, and have been associated with, the few Native American semi-subterranean dwellings identified in New England. Recognizing structural attributes is essential for understanding Native American settlement patterns, intrasite complexity, sociopolitical structure, and population data. Small groups or families during the Archaic Period may not have only used the typically-portrayed wetus of the Contact Period, and it's important to think beyond the norm. Furthermore, the Halls Swamp Site has evidence for a fall and winter inland encampment, which necessitated a hardier dwelling than a summer wetu. High investment in the construction of features was not unusual for Archaic Period peoples. Comparisons of sites from Native cultures along the east coast and further west, where archaeological signatures are better preserved, have provided data in regard to structure preference in certain environmental climates or zones.

Fogel, Marilyn [171] see Terwilliger, Valery

Foias, Antonia (Williams College), Jeanette Castellanos (San Carlos University, Guatemala) and Kitty Emery (University of Florida-Gainesville)
[125] *Ceramics and Polity at Motul de San José and its Periphery*

Motul de San Jose entered its Golden Age during the Late Classic. It was located at a critical crossroads in the Central Petén Lakes region, sitting between the east-west San Pedro Martir River that connected it to the Western Petén kingdoms all the way to Yaxchilan, and a north-south route that tied it with Tikal in the north and Dos Pilas and the other Petexbatun centers in the south. The political alliances between Motul and these kingdoms were materialized through the gifting of Ik' Style polychromes to the royal families and secondary elites of these centers, and recorded in hieroglyphic texts. In this paper, we will be exploring further ceramic connections between Motul and the other Western kingdoms, while at the same time querying the ceramic differences which created a separate political identity for the people of the Ik'a kingdom.

Foias, Antonia [5] see Emery, Kitty

Foin, Jeremy [319] see Darwent, Christyann M.

Foit, Franklin, Jr. [226] see Reid, Kenneth

Folan, William J. (Univ. Autónoma de Campeche), Maria del Rosario Dominguez C. (Univ. Autonoma de Campeche) and Joel D. Gunn (Univ. of North Carolina, Greensboro)

[217] *Maya Palaces: Royal Courts of the Ancient and Not-So-Ancient Maya*

The Palaces of the Petén Campechano and the remainder of the Yucatán Peninsula represent single and composite, royal multipurpose households of varying shapes and sizes often associated with triadic relationships representing religious, civic, and military responsibilities. These relationships are manifest in structures at Calakmul, Oxpemul, Becan, Santa Rosa Xtampak, the triadic Monjas Quadrangle of Uxmal, Structure #385 of Dzibilchaltun, the triad of Noh Cah Chan Santa Cruz, El Palacio de Nachi Cocom, the Lacandon triad of Sac Balam in Chiapas and perhaps, the three brothers of Chichén Itzá. They represent continuity in Maya Lowland culture from Preclassic times to the present.

Follensbee, Billie (Missouri State University)

[60] *Nets, Gauges, and Weights: More on Formative Period Gulf Coast Textiles and Technologies*

While considerable research has been conducted on the importance of textiles in Mesoamerica, little study has been done on textiles among Formative Period cultures such as the Gulf Coast Olmec. This is in great part because direct evidence of early textiles is scanty, consisting only of a fabric-impressed clay sherd, some hand-formed spindle whorls, and fragments of cordage and woven mats. As noted in my recent publications, however, depictions of textiles in Olmec sculpture provide additional material for analysis, and further evidence can be found in the reexamination of small stone artifacts recovered from Gulf Coast sites. Close analysis has revealed, for example, that objects previously identified as "bloodletters" much more likely served as functional weaving picks and awls, and that "spoons," in their original, long-tailed form, closely resemble and function well as small weaving battens. Most recently, my research has confirmed through testing and replication studies that perforated limenite blocks most likely served as weights for fishing nets, and that greenstone artifacts may have served as gauges for making nets of different types. All together, these data reveal much about the making and use of ancient textiles, and that textiles held considerable importance for these Formative Period cultures.

[60] *Chair*

Fonseca Ibarra, Enah Montserrat (INAH), Sharon Herzka (Centro de Investigación Científica y de Educación), Miguel Téllez (Universidad Autónoma de Baja California [UABC]), Miguel Santa Rosa del Río (Universidad Autónoma de Baja California [UABC]) and René L. Vellanoweth (California State University, Los Angeles)

[142] *Year-Round Shellfish Harvesting during the Middle to Late Holocene on the Northwest Coast, Baja California*

Knowledge of patterns of subsistence and seasonal settlement strategies on the northwest coast of the Baja California Peninsula is still scarce. In order to identify shellfish harvesting patterns from Middle to Late Holocene, oxygen isotope determinations from 66 California mussel shells (*Mytilus californianus*) from three archaeological sites in the coastal area of Bajamar-Jatay were analyzed. The results suggest that mussels were collected mainly during the fall and winter seasons (63.6%); followed by summer (24.2%), spring (9.1%) and to a lesser extent in late summer/early fall (3%). Except for one stratum in which the capture seems to have taken place primarily during the fall, most shellfish harvesting occurred year-round, both in the shell middens of the Archaic (4657 cal BP) as of Late prehistory (1352–846 cal BP). Shellfish harvesting may have been essential in the diet of the prehistoric human groups that seem to have occupied residential bases throughout the season cycle.

Fontes, Lisa (University of New Mexico)

[165] *The Elusive Vasco-Cantabrian Middle Magdalenian: Reflections from Urtiaga Cave, Guipúzcoa, Spain*

The Vasco-Cantabrian Middle Magdalenian (14.3–13.2 ka uncal. BP) remains intangible—known in the region from relatively few archaeological sites and principally defined on the basis of portable art items with Pyrenean origin. Recent research undertaken with collections from Urtiaga cave (Guipúzcoa, Spain) has included two radiocarbon assays of Level E that date to the Middle Magdalenian interval. This level lacks diagnostic portable art items, however, lithic and faunal analyses (conducted by Altuna 1972) have been made, which permit analyses of Middle Magdalenian economic behaviors. This paper will convey how human behaviors shifted between the well-defined Lower and Upper Magdalenian periods in the Vasco-Cantabrian region, and identify economic patterns that archaeologists can use to explore and compare Magdalenian groups' adaptations at sites with and without temporally diagnostic artifacts.

[165] *Chair*

Fontes, Lisa [79] see Horowitz, Rachel

Fontugne, Michel [226] see Boeda, Eric

Foor, Thomas A. [50] see Neal, Katie

Ford, Anabel [9] see Chiarulli, Beverly

Ford, Owen (Adams State University)

[300] *From Mining to Mercury: Preservation of the Historic Industrial Landscape of Jackson, California*

Nestled in the foothills of the western Sierra, the city of Jackson in Amador County, California was the location of some the richest gold deposits mined in the Gold Rush era Mother Lode. Over the last few years, several projects have been initiated on this historic industrial landscape. The City of Jackson began raising funds to help preserve the uniquely stunning tailing wheels that have dominated the skyline for more than a century. Conversely, well beyond locally available funds is the problem of toxic cleanup as a result of nearly a century of mining efforts. Mercury, arsenic, and lead currently rest under significant portion of the city. Recently, the Environmental Protection Agency's National Priority List, commonly known as the Superfund, has added the Argonaut Mine in Jackson for federal aid in toxic cleanup. This poster will summarize the challenges of both preservation and hazardous cleanup on this cultural landscape.

Foreman, Lindsay

[247] *CRM Archaeology and Collections Management—A Comparison between two Canadian Provinces*

My CRM career has included positions in both British Columbia and Ontario, two provinces situated on opposite sides of the country. Working for the same consulting firm in both provinces, I have had the opportunity to manage the analysis and curative preparation of large precontact Aboriginal collections. This experience has resulted in the observation of strengths and weaknesses in current British Columbia and Ontario heritage legislation, archaeological permitting regulations, and collections management. In this paper, I will demonstrate the need for and advantages of better communication between:

- the Canadian provincial departments overseeing heritage management;
- Canadian CRM archaeologists and archaeological firms;
- Canadian museums and academic institutions serving as curatorial facilities; and
- CRM archaeologists and collections curators.

CRM archaeologists need to work closely with curators to develop consistent collections curation standards and practices that fit within project budgets and schedules. Further, more Canadian CRM firms need to recognize the importance of hiring and maintaining staff with collections management and curation experience. Without these improvements, the success of preserving our country's heritage for future generations will remain subjective.

Forest, Marion (Arizona State University) and Grégory Pereira (CNRS, UMR 8096 ArchAm)

[293] *From Compass to Lidar: Forty Years of Mapping the Tarascan Cities of the Malpaís of Zacapu, Northwestern Mexico*

Since their discovery in the late XIXth century, the large prehispanic urban settlements located close to the modern town of Zacapu (State of Michoacán, Mexico) have confronted the archaeologists to a great challenge: mapping, and understanding 200 hectares of dense and well preserved urban features founded on the Malpaís of Zacapu (a complex formed by ancient lava flows). Interpreted as premises of the Tarascan State (occupation AD 1250–1450), these cities constitute an unprecedented regional urban transition. In 1983, more systematic archaeological surveys and excavations were initiated at the region, starting 30 years of mapping method applications and tests aiming to assess this important archaeological data. After 30 years of fieldwork, the Malpaís of Zacapu sector has been covered by a full high-resolution lidar map that opened various analysis opportunities, and archaeological record confirmation or correction. In this presentation we aim to reconstruct the evolution of mapping methodologies used between 1983 and 2015, and present the advances of the lidar data analysis conducted since 2015. The case of Malpaís Prieto, one of the most important agglomerated settlements on the Malpaís terrain will be presented as a case study.

Forest, Marion [340] see Manin, Aurelie

Forestier, Hubert [78] see Li, Yinghua

Forné, Mélanie [125] see Arnauld, Charlotte

Forrest, Crystal [30] see Pfeiffer, Susan

Forrest, Daniel (PAL, Inc.)

[16] *Discussant*

Forsyth, Donald W. [337] see Hansen, Richard

Forsythe, Kyle (University of Western Ontario)

[52] *Ceremonial Artifact Breakage in the Archaic Period of Eastern North America*

Intentional breakage of artifacts proliferates throughout the archaeological record in Eastern North America. Using the case of a Middle Archaic site (ca. 5000–4500 BP) from Ontario, this paper seeks to examine and compare the strategies for purposely damaging artifacts, with focus placed on gaining insight into motivations for breakage. Through the refitting of artifact fragments it is possible to identify when breakage was intentional and implemented

for purposes beyond subsistence activities. Similar patterns found in the experimental breakage of reproduction artifacts offer novel perspectives into the social conceptions of tools for Archaic hunter-gatherers.

Fort, Joaquim (Universitat de Girona), Victor L. de Rioja (Universitat de Girona), Neus Isern (Universitat de Girona) and Jose M. Cobo (Universitat de Girona)

[38] *The Neolithic Transition in Europe: Archaeology versus Genetics*

There are two mechanisms of Neolithic spread: demic diffusion (dispersal of populations) and cultural diffusion (acculturation of hunter-gatherers). Archaeological data imply that demic diffusion was more important than cultural diffusion in determining the spread rate of the Neolithic in Europe. But those results are very uncertain. We now use ancient genetic data in addition to archaeological data, and estimate the relative importance of demic and cultural diffusion. We find that demic diffusion was, indeed, substantially more important than cultural diffusion at the continental scale.

Forton, Maxwell (Binghamton University)

[390] *Corridors of Interaction: Using Chuskan Ceramics and Lithics to Reveal the Larger Sociopolitical Hierarchy of Chaco Canyon*

Unraveling the complex relationships that existed between Chaco Canyon and outlier communities is essential to understanding how and why Chaco rose to prominence and the nature of its sociopolitical authority. Key to this debate is evaluating the interactions between Chaco Canyon and the great house communities of the eastern slope of the Chuska Mountains. This region produced substantial quantities of the lithics, ceramics, timber, and food found within Chaco Canyon. The social conditions that brought these materials to the canyon has been central to various interpretations of the Chaco Regional System. My study aims to shed light on this exchange of materials by comparing the ratio of Chuskan goods (trachyte-tempered ceramics and Narbonne Pass chert) found in San Juan Basin great house communities lying between Chaco Canyon and the Chuska Mountains. This allows us to see where Chuskan goods were being distributed across the San Juan Basin, and whether certain communities were participants in the funneling of goods to meet the material needs of Chaco. This study evaluates several models of the sociopolitical structuring of Chaco and addresses the complex and potentially diverse relationships that existed between Chaco Canyon and outlier great house communities of the San Juan Basin.

Foster, Rhonda

[361] *Discussant*

Foster, Thomas [197] see Williams, Nancy

Foubert, Jacob (University of Iowa) and James McGrath (University of Iowa)

[154] *Of Ostrich and Ochre: The Application of pXRF to Detect Experimentally Pigmented Ostrich Eggshell*

Ostrich eggshell (OES) is a somewhat common occurrence in Middle and Later Stone Age archaeological contexts. Ethnographically, OES are known to be used as containers, raw material for bead production, and the egg itself as a valuable food source. Archaeologically, it is difficult to determine which of these potential functions the OES fulfilled. The application of mineral pigment powder to OES may suggest a non-subsistence function for that particular piece. For this study we experimentally produced mineral pigment powder out of hematite and applied it to modern OES. We then proceeded to wash, cook, and otherwise remove the powder and subsequently sample the modified OES with portable X-ray fluorescence (pXRF). Results from this study may suggest the utility in identifying pigmented OES within the archaeological record.

Foubert, Jacob [342] see Truhan, Rebekah

Fournier, Cory (Northern Arizona University) and Francesca Neri (Northern Arizona University)

[375] *Comparative Analysis of Petroglyphs at the Crack-in-Rock Community*

Recent archaeological research in Wupatki National Monument has led to a complete baseline documentation of a suite of petroglyph assemblages located at the Crack-in-Rock community in Northern Arizona. Through collaborative efforts between the Museum of Northern Arizona, the National Park Service, and Northern Arizona University, this paper details a comparative analysis approach to understanding the use and placement of rock art within the region. The Crack-in-Rock community boasts numerous standing architectural features and over 300 petroglyph panels, yet the area is surprisingly devoid of cultural artifacts. In an area well-known for its abundance of cultural remains, the community stands as an outlier in the national monument. In an effort to better understand Crack-in-Rock's placement in the regional context, the petroglyph assemblages at the three sites in the community—Crack-in-Rock, Middle Mesa, and Horseshoe Mesa—were subject to both statistical and spatial analysis. The findings of this paper demonstrate how rock art research can broaden our understanding of the cultural landscape of the past.

[375] *Chair*

Fournier, Patricia [84] see Castillo, Mario

Fowler, William (Vanderbilt University)

[395] *Material Encounters and Indigenous Transformations in Early Colonial El Salvador*

Mapping and excavations of the Conquest-period and early colonial site of Ciudad Vieja, the ruins of the first villa of San Salvador, El Salvador, afford a view of material culture encounters and indigenous transformations in northern Central America. The Ciudad Vieja archaeological research has focused on material culture encounters between Spanish and indigenous populations in the realms of landscape, architecture, technology, economy, society, and religion. The time span for Ciudad Vieja runs from the Conquest to the mid-sixteenth century, from 1525 to about 1550. Subsequent developments are investigated at the site of Caluco, in the Izalcos region of western El Salvador, during the last quarter of the sixteenth century. A theoretical framework inspired by Pierre Bourdieu's structural theory of practice allows for interpretation of differing strategies of practice during the early Spanish Colonial period of the sixteenth century. The early "Spanish" community of San Salvador, sited on an already ancient Mesoamerican ritual site, was an incubator of experimentation and transformation of Mesoamerican roles and identities. By the time of Caluco's colonial community, practices and structures found in later Latin American communities, built on tensions between indigenous communities and state extraction, are increasingly apparent.

[218] *Discussant*

Fowles, Severin (Barnard College, Columbia University)

[34] *Choosing Nomadism: On Northern Tiwa Flights to the Southern Plains*

In Southwest archaeology, we are accustomed to thinking about the relationship between the Southern Plains and the Pueblo region in terms of the movement of objects in a continental economy of mutualistic exchange. Hunters moved buffalo meat and hides west; horticulturalists moved corn, lithics and ceramics east. With the onset of the Spanish colonial project, the movement of objects within the Plains-Pueblo macroeconomy intensified. Guns, knives and horses were added to the flow of goods. And the traffic in human captives—which had surely been present in precolonial times at low levels—grew dramatically. There is much more to this tradition of Plains-Pueblo exchange, however. Indigenous testimony, archaeological evidence and colonial documents all point to a persistent history of the movement of social groups, and sometimes of entire societies, back and forth, as formerly Plains nomads became settled Pueblo people and vice versa. This paper looks to the rich case of the Northern Tiwa-speaking pueblos of the northern Rio Grande valley, whose precolonial and colonial histories reveal that such interregional movements not only were socially constitutive but also served as vital political strategies.

Fowles, Severin [192] see Charm, Elisheva

Fox, Jacqueline (Arizona State University), Skyler Claunch (Western State Colorado University) and David M. Hyde (Western State Colorado University)

[11] *Excavation of a Plaza Platform at Group A of the Medicinal Trail Community: A Hinterland Maya Site in Northwestern Belize*

Previous excavations at Group A of the Medicinal Trail Community indicated a long occupation of the area, possibly dating back to the Middle Preclassic. In an effort to identify the earliest occupational phase at the group, we excavated the Middle Courtyard plaza platform of Group A to a depth of just over 2 m below surface. Results of the 2016 field season brought greater understanding of the extensive amount of energy expended in building from the original foundation of the structures to what is visible on the surface today at this hinterland site. This poster presents a discussion of the 2016 excavations which included the exposure of eight floors and at least as many construction phases, revealing a shift in structure alignment and construction techniques through time. While the season only allowed for exposure down to Late Preclassic features, there is great promise that Middle Preclassic features at the site will be present below this phase of construction and revealed next season.

Fox, Mathew, Jennifer Kielhofer (University of Arizona) and Ye Wa (Institute for Field Research)

[279] *Micromorphology and Isotopic Geochemistry of the Yangganzhai Moat Deposit*

Geoarchaeological research conducted at the Yangganzhai Site was tasked with identifying the composition and formation processes associated with one of the most striking features of the site, the Yangganzhai "moat." Originally, it was hypothesized that this moat was filled with thick packages of ash related to the manufacturing of pottery at the site. Therefore, micromorphology and isotopic geochemistry were employed to further examine moat sediments. Samples collected from the moat have $\delta^{13}\text{C}$ values that range from -12.90‰ to -5.17‰ and $\delta^{18}\text{O}$ values from -11.41‰ to -8.72‰ . Thirteen out of the seventeen samples have isotopic values that are identical to bulk soil carbonates. This indicates that most of the sediment is natural. Only two samples have isotopic values that are positively correlated and fall on an ash regression line. Micromorphology of the sediment is also in good agreement with the isotopic results. A majority of the sediment is composed of either soil/loess aggregates, or the inedible fraction of plants and animals. Diagnostic aggregates of micritic calcite (ash) were accurately identified, but are found in isolation and represent $<2\text{--}3\%$ of the deposit. Our results suggest that the Yangganzhai moat was largely filled in by localized colluviation and the dumping of refuse.

Fox, Sherry [252] see Fu, Janling

Fox, Steve and Jaime Awe (Northern Arizona University)

[187] *Sacrifice in the Name of Ancestors: An Analysis of the Relationships between Terminus Groups and Site Cores in the Belize Valley*

The functions of cosmologically oriented structures within the site core of Ancient Maya sites have been analyzed by archaeologist throughout time. However, the role of terminus groups in relation to the function of site cores have received little attention. In this paper, we analyze the function of the Zopilote Complex, a Terminus group located south of the Cahal Pech site core. Excavations on Str. 1 at Zopilote uncovered two elite burials accompanied by evidence of human sacrifice. Furthermore, a Terminal Classic (AD 600–900) deposit was excavated on the west side of STR 2 containing over 50,000 ceramic sherds, chert cores and flakes, obsidian blades, and fragments of a Pedregal Modeled Incensarios. We argue that archaeological evidence from both structures indicate that extensive ritual activities were conducted at Zopilote from Late Preclassic (300 BC–AD 250) to Terminal Classic times, in association with ancestor rituals. Our hypothesis of the function of Zopilote as a ritual center will be cross compared with the site core of Cahal Pech in order to establish any correlates that illustrate the relationship between terminus groups and site cores and how this relationship coincides with the ancient Maya worldview.

Fox, William (Adjunct Professor, Department of Anthropology)

[393] *Extended Relations in the Great Lakes Region*

Archaeological evidence from the Great Lakes region reflects fluctuating periods of long distance contacts over the past millennia. The mechanisms behind and meaning of these networks is considered in light of site-specific and regional distribution patterns of "exotic" goods.

[216] *Discussant*

Frachetti, Michael (Washington University in St. Louis), Edward Henry (Washington University in St. Louis), Taylor Hermes (Kiel University), Elissa Bullion (Washington University in St. Louis) and Farhod Maksudov (Institute of Archaeology, Uzbekistan)

[29] *Terra Cognita: Technological approaches along the High Mountain Silk Road*

Using remote sensing techniques along with standard archaeological survey in 2011 our collaborative team discovered the Silk Road city of Tashbulak, located at roughly 2,000 m elevation, in the mountains of Uzbekistan. The modern environmental and political particulars of this high-altitude city made the use of aerial photography and Geophysics essential tools for documenting this unexpected mountain site and allowing for clear documentation and targeted research in a (geographically) restricted and remote territory of Central Asia. Our archaeological investigations make full use of a broad suite of digital technologies, including kite photography, 3D photogrammetry, magnetometry, and ground-penetrating radar, GIS, and digital simulation to reconstruct a "live view" of a unique and alternative form of urbanism pioneered by medieval nomads in the high-mountains of Inner Asia (ca. 1000 CE). Ultimately, these approaches allow us to tell a new story about the complex interactions, economic relationships, and political and ideological lives of the Qarakhanid Empire, Asia's largest nomadic Empire before "the Mongols."

[221] *Discussant*

Frachetti, Michael [290] see Hermes, Taylor

Francigny, Vincent (SFDAS)**[219]** *The Elite Meroitic Necropolis of Sai Island Part I: Mortuary Interpretations*

Sai Island, located in northern Sudan between the 2nd and 3rd Nile cataracts, boasts a rich archaeological history spanning from the Paleolithic to modern times. Recent archaeological excavations conducted by the French Unit of the National Corporation for Antiquities and Museums have focused on a small elite Meroitic necropolis (300 BC–AD 350). Similar to other fringe elite Meroitic cemeteries such as Sedeinga, the Sai Island cemetery features pyramid mortuary structures with descendaries leading into burial chambers located under the pyramid structures. While burial chambers appear to have been only used for adults, Meroitic elite subadult burials have been located within the walls of the pyramid structures. Complicating the archaeological interpretation are Christian subadult burials (AD 600–1500) that were interred in the descendaries, later Ottoman burials (1820–1881) interred throughout the necropolis, and significant comingling due to looting. Here we present the initial interpretations of the mortuary complex and what it has revealed about the Meroitic elite of Sai Island.

Francigny, Vincent [219] see Dupras, Tosha

Franco, Nora V. (CONICET-UBA), Danae Fiore (CONICET-UBA), Agustín Acevedo (CONICET), María Virginia Mancini (Universidad Nacional de Mar del Plata) and George A. Brook (University of Georgia)**[62]** *The Southern Deseado Massif (Patagonia, Argentina): Spatial Knowledge and Changes in Its Use from the Pleistocene-Holocene Transition to the Late Holocene*

The semiarid Southern Deseado Massif (SDM) is highly variable in geology, geomorphology and the spatial and temporal availability of water. To the south it transitions into open lowlands and basaltic plateaus dissected by canyons that extend to the Chico River. The La Gruta 1 rockshelter in the extreme south of the SDM has provided the oldest evidence of human logistic occupation in the area, with ages between ca. 12,800 and 12,000 cal yr BP, when conditions were wetter than today. Human use and knowledge of the area's lithic resources increased between ca. 10,700 and 7700 cal yr BP, although rock art is scanty and isolated. Following a dry period, there was an increase in human presence from ca. 5550 cal yr BP, a change in lithic technology, and more frequent rock art, including adult and child hand motifs, in places with better water availability. Hunting blinds in areas devoid of outcrops and complex geometric rock art motifs are attributed to the last 2,000 years, being the only gap in occupation during the Late Holocene probably related to the effect of the Medieval Climatic Anomaly

Franco, Nora V. [232] see Pintar, Elizabeth

Franco J., Regulo [382] see Quilter, Jeffrey

Frank, Kate [151] see Kristy, Gwendolyn

Franklin, Tiffany [10] see Venter, Marcie

Franklin, Olivia (Idaho State University), John Dudgeon (Idaho State University), Amy S. Commendador (Idaho Museum of Natural History), Rebecca Hazard (Idaho State University) and Michael Dega (Scientific Consultant Services, Inc.)**[123]** *Bioarchaeological Evidence for Diet in a Latte Period Assemblage from Saipan, CNMI*

Garapan, a Latte Period (AD 1000–1521) archaeological site in Saipan, Northern Mariana Islands, was excavated under mitigation efforts by Scientific Consultant Services, Hawaii in 2015. The recovery produced over 400 sets of skeletal remains, of which forty-eight were submitted for dietary bioarchaeological analysis in the Center for Archaeology, Materials and Applied Spectroscopy. This research focuses on the importance of marine versus terrestrial protein sources and introduced plant cultigens to investigate possible cultural affiliation via diet at Garapan. A stepwise methodology is employed to identify dietary patterns, including the evaluation of bone preservation using ATR-FTIR, extraction and analysis of collagen and carbonate stable isotopes, and extraction of microfossil and organic residues from dental calculus. Whereas stable isotope analysis of archaeological bone can offer probabilistic insights into major classes of proteins and starches in the diet, microfossil analysis may produce a more deterministic evaluation of particular components of the diet, through identification of taxon-specific starches, phytoliths and organic molecules embedded in the calculus matrix. Using this combined approach, we present our bioarchaeological dietary assessment and offer insight into how this stepwise method for investigating diet in archaeological samples provides additional data points for understanding cultural affiliation through subsistence in Micronesia.

Franklin, Jay and S. D. Dean (East Tennessee State University)**[160]** *Pisgah Archaeology in the Upper Reaches of the Tennessee Valley*

Pisgah in upper East Tennessee appears to represent fluid, adaptable communities of practice in the upper reaches of the Tennessee Valley. It reflects various but limited elements of Mississippianization. Pisgah also appears to have crosscut ethnic boundaries. On the Holston, it was associated with the Dallas archaeological culture, while on the Nolichucky and Watauga, it was associated with Qualla (Cherokee) and also perhaps proto-Catawban wares. Pisgah in the region does not appear to have been associated with chiefdoms, nor was it associated with mound centers. We explore Pisgah variability in terms of chronology, material culture, and Mississippianization.

Franklin, Kathryn (School of the Art Institute of Chicago) and Astghik Babajanyan (National Academy of Sciences Institute of Archaeology)**[221]** *Medieval Worldbuilding and Cosmopolitics: Armenia on the Silk Road*

This paper presents observations from recent seasons of research in the Vayoc Dzor region of southern Armenia, in the context of a long-term and multi-sited program of investigations into the intersections of locally situated highland social phenomena within the broader Silk Road cultural ecumene during the late medieval period (AD twelfth–fifteenth centuries). This ongoing project builds on an understanding of late medieval Armenian participation in and coproduction of the worlds of the Silk Road, developed from excavations and epigraphic research sited in transit and monumental spaces of the highlands. The current research deepens a distributed focus on material worlds produced and imagined at rural village sites in addition to, and conversant with, urban medieval life. The most recent two seasons of work have centered on Armenia's Southern Silk Road Heritage Corridor, a dense web of archaeological palimpsest landscapes ranging over the regions of Vayoc Dzor and Syunik. This paper will explore the potentials of new datasets produced through survey in Vayoc Dzor and excavations at the site of Arpa, and the implications of these datasets for innovative spatial, material and historical understandings of medieval Armenia and the situatedness of the medieval Caucasus within a practice-based Silk Road cultural ecumene.

Franklin, Moeana (College of Wooster) and Paul Nick Kardulias (College of Wooster)**[342]** *Age-at-Death Estimations from Helton Mound 20*

The original age at death estimations of the adult individuals excavated from Helton Mound 20 (Middle to Late Woodland) in the Lower Illinois Valley were reevaluated using Transition Analysis. In addition, a taphonomic evaluation of each individual was undertaken to determine the ways in which the bones would have been modified during their interment. The goal is to understand how the current recognition of taphonomic processes differs from the original estimations from the 1970s and how that affects the estimations of age at death. The results suggest that taphonomic damage had an effect on the original age estimation because the current works suggests the individuals were younger than the originally suggested. These results are the product of a better comprehension of taphonomic processes that scholars have acquired in the past four decades. The new information can provide a more precise understanding of mortuary rituals, health patterns, and social structure of this population. The amount of weathering suggests postmortem treatment of the remains, with exposure to the elements for extended periods of time. Transition Analysis and other basic methods for estimating age at death are discussed to gain an understanding of their benefits and drawbacks in such research.

Franks, Jocelyn [17] see Budhwa, Rick

Frederick, Gay [46] see Stewart, Kathlyn

Frederick, Kathryn (Michigan State University) and Meghan Howey (University of New Hampshire)**[319]** *What's in a Hole? Memory, Knowledge, and Personhood in the Cache Pit Food Storage Features of Northern Michigan*

Physical food storage is one mechanism hunter-gatherers use to even out the variability of subsistence resources throughout seasonal cycles. Food storage facilities are typically plain, undecorated constructions basic to mundane needs and as such, food storage features do not necessarily appear at first look as social technology, that is, as objects that extend personhood. However, we suggest food storage facilities, in ensuring the fundamental continuation of the human body, can never be separated from issues of personhood, biologically but also beyond—morally, socially, symbolically. Here, we examine interactions between local hunter-gatherer communities and their immovable food storage cache pit features in the inland lake landscape of Douglas and Burt Lakes in Northern Michigan during Late Precontact (ca. AD 1000–1600). Our archaeological data indicates that these storage features were not only more widespread than previously recognized, but also intensely planned within the landscape. When storage features are considered a social technology, we can begin to understand them as features that inscribe knowledge and memory densely across the landscape.

Freeland, Travis (Simon Fraser University)**[123]** *Monuments, Boundaries, and Chiefly Competition in the Development of the Tongan State*

The principal Tongan island of Tongatapu was the epicenter of a hierarchical and geographically integrated society which some archaeologists contend reached the level of archaic state by AD 1300–1400. Dynastic chiefs affirmed their power and rights to land through monumental construction and a dispersed settlement pattern that fully occupied their inherited territories with lower-ranking members of their kin-based corporate groups. Recent archaeological survey, aided by lidar, reveals the surviving totality of monumental and community-level construction on Tongatapu. Thousands of mounds and other features, products of some 1,000 years of funerary behavior, chiefly competition, and conflict, are highly structured in their arrangement on the landscape. In this paper, I describe this new, detailed understanding of community-level and monumental architecture on Tongatapu, with a focus on the form and distribution of earthen mounds, the latter suggesting a demarcation of territories and boundaries with significant time depth. I consider the utility of the peer-polity model for understanding chiefly interaction during the development and consolidation of the Tongan state. I argue that monumentality, whether in the context of ritual, residential, or funerary architecture, is significant as a visual reminder of inter- and intra-group relations and the maintenance/reconfiguration of the social order.

Freeman, Andrea (University of Calgary)**[110]** *Discussant***Freeman, Jacob (Utah State University)****[383]** *The Effect of Property Rights on Low-Level Food Production*

A basic premise of economics is that more secure property rights reduce conflict and provide an incentive for individuals to invest capital to increase productivity. This premise underlies recent theories developed by archaeologists that food production and more secure property rights, by necessity, coevolve. The argument goes like this: Dense and predictable resources provide an incentive for more secure property rights and more secure property rights provide an incentive for individuals to modify ecosystems and make them more productive. In turn, more productive ecosystems favor more investment in property rights. In this paper, we evaluate the effect of property rights on low-level food production among ethnographically recorded hunter-gatherers. We use path models to control for confounding variables and explore whether the causal structure proposed by recent arguments for the coevolution of property rights and food production fit the data. The effect of property rights on low-level food production is always positive, but does not mediate ecological variables, as recent coevolutionary theories would predict. Moreover, the effect size of property rights on low-level food production is very weak relative to other ecological variables. We discuss the implications of these results for predicting trajectories of hunter-gatherer intensification in the archaeological record.

Freeman, Jacob [344] see Hard, Robert

Freeman, Jeremy (Great Basin Institute), Mary Oster (Great Basin Institute) and Jason Theuer (National Park Service)**[273]** *A Tale of Two Management Plans: Comparing Visitor Impacts to Rock Art Sites on National Park Service Land vs. San Bernardino County Land*

On July, 6 2016, it was announced that management of the Coyote Hole rock art site located near the village of Joshua Tree, California, would be transferred from the San Bernardino County Flood Control District to the Native American Land Conservancy. The site's proximity to Joshua Tree National Park (JOTR) provides a unique opportunity to compare this highly-accessible site with unregulated visitation to similarly threatened sites that are managed by JOTR. The publication of sensitive information pertaining to JOTR rock art sites, particularly through social media, has increasingly threatened sites and raised concerns regarding the effects of increased visitation. JOTR staff conducted a study of three panels at Coyote Hole and three panels within the park that exhibit variable degrees of accessibility, visitation, and histories of graffiti remediation. A methodology was developed to monitor and compare the transformational processes affecting rock art sites providing a better understanding of how increased visitation may adversely

affect sites on public land. The methods and data here presented will be used to develop management plans for Coyote Hole and JOTR to determine appropriate visitation management strategies for rock art sites.

Freidel, David (Washington University in St. Louis) and Olivia Navarro-Farr (College of Wooster)

[179] *Quintessential Queen of Kaanul: K'abel of Waka' in the age of empire.*

Classic Maya civilization witnessed the reigns of many great queens, but the greatest in the southern lowlands was Kaloonte' K'abel of Waka'. She presided over the routes of conquest in western Petén during the seventh century wars of Yuknoom Ch'een the Great. During her lifetime she and her consort King K'inich Bahlam turned the power of the ancient Wite' Naah Fire Shrine, its Moon Goddess, its Death God Akan, and its other gods to the conquest and subjugation of Tikal. She and her city knew glory and violent defeat etched into buildings, monuments, and tombs. We trace the ark of the Queen of the West in the archaeology of her city.

[329] *Discussant*

Freidel, David [131] see Marken, Damien

Freiwald, Carolyn (University of Mississippi)

[276] *A Step-by-Step Guide to Excavating Burials, or How a Bioarchaeologist Can Be in Two (or Three) Places at Once*

Bioarchaeologists often are faced with the challenge of managing field excavations and lab analyses of skeletal remains at the same time, along with student and staff training and curation of osteological remains. I present results from recent fieldwork at the Classic Maya sites Actuncan and San Lorenzo, Belize that were excavated using a method designed for non-osteologists. This includes complex burial deposits that were re-entered, secondary burials, and comingled and disturbed remains that seemed to require a highly experienced osteologist. Careful taphonomic observations reveal minute details about bones, burial grounds, and ancient Maya beliefs about death and the afterlife. The presentation includes a review of published excavation protocols, and then describes a variation that does not require the excavators to be osteological experts, meets the ethical obligations anthropologists have when excavating human remains, and illustrates some of the challenges faced by osteologists working with fragmentary remains in tropical environments.

[276] *Chair*

Freiwald, Carolyn [5] see Brown, M. Kathryn

French, Kirk [7] see Hermitt, Elijah J.

French, Jennifer (University College London)

[282] *Women in Small-Scale Societies: How Demographic Archaeology Can Contribute to Gender Archaeology*

Demography has reemerged as a growing research area within archaeology. Recent studies have refined archaeological demographic methods and developed models which cite demographic change as a key variable in explaining social and artifactual change. However, one aspect which has not been explicitly acknowledged is how archaeological demography is intrinsically concerned with women. In this paper I explain the importance of women to the demographic regimes of small-scale societies and discuss how, as a result of this, archaeological demography can contribute to the aims and practice of gender archaeology. I argue that archaeological demography places primacy on women as visible, active, agents of past demographic (and, consequently, social) change, explaining how changes in women's behavior generate demographic patterns. Using the Neolithic Demographic Transition as an example, I discuss how the long-term, regional population trends documented through archaeological demographic research provide a record not only of changes in the behavior of women, but also offer insight into past gender dynamics through the impact that gender as a fluid structuring principle of social life has on the lives and actions of both women and men.

Freund, Kyle (Indian River State College) and Tristan Carter (McMaster University)

[22] *Obsidian Characterization at the McMaster Archaeological XRF Laboratory: Case Studies from the Italian Island of Sardinia*

The McMaster Archaeological X-ray fluorescence Laboratory (MAX Lab) was established in 2010 with the goal of using compositional analyses of archaeological objects to engage with broad-level questions about past human behavior. In this context, obsidian has been the primary artifact type analyzed, taking form through the sourcing of artifacts to the geological sources from which they originated. As an example, this presentation focuses on prehistoric obsidian exploitation on the central Mediterranean island of Sardinia (ca. sixth–second millennia BC). Using data obtained through the collation of published sourcing studies along with primary analyses of individual assemblages this study contextualizes changes in obsidian consumption through time. Key issues surrounding the recognition of various exchange mechanisms in the archaeological record are discussed as well as the specific circumstances behind the development of large-scale Sardinian obsidian circulation networks, the contraction of these same networks at the time of the first metalworking, and the reconfigured modes of consumption characteristic of the Bronze Age and Nuragic eras. This presentation highlights how the MAX Lab has been instrumental in promoting integrated characterization programs that are critical in interpreting the role of obsidian and other materials within larger socioeconomic processes throughout the Mediterranean, Anatolia, and beyond.

Freund, Kyle [178] see Tykot, Robert H.

Freie, Adrienne (University of Wisconsin-Milwaukee)

[340] *Something Other: Birds in Early Iron Age Slovenia*

Human-bird relationships in Early Iron Age Slovenia are marked by apparent contradictions—birds are extremely rare in the zooarchaeological record as a whole, and completely absent from mortuary contexts that are otherwise notable for the deposition of animal remains. Yet birds are the most frequently represented animal in Early Iron Age art. Experience of birds would have been relatively constant—birds are almost always present, yet human relationships with them were likely based more on observation than direct interaction. The distinction of these animals was drawn upon and reinforced in local artistic representations, cementing their place as ideologically significant and set apart from domesticates and other wild animals. In this case study, patterns in the depiction of birds from the Dolenjska Hallstatt culture will be juxtaposed to depictions and zooarchaeological remains of horses and red deer, respectively the most common domesticates and wild animals depicted in Early Iron Age art. It is proposed that due to their categorization as neither wild nor domestic, birds may have played an important role in local ritual, mediating between humans and other animals as well as between humans and extra-human forces.

Friedel, Rebecca [7] see Batty, Sylvia

Friedl, Lukas [165] see Haws, Jonathan

Friel, Robert [224] see Maher, Ruth

Frieman, Catherine (Australian National University)

[168] *Barrow Roads and Bronze Age Wayfaring*

The idea of the journey is central to many narratives of European Bronze Age social structure, economy, and cosmology, but the mechanics of journeying in the Bronze Age are rarely discussed. We know that objects and raw materials traveled great distances, we think that exotic things and ideas were sought after, and it appears that Bronze Age people maintained ties with kin and trading partners over very great distances. Much of this distance was inevitably traversed on water; and riverine distribution maps and scarce finds of boats and maritime assemblages have been scrutinized for details about the intensity and directionality of Bronze Age trade and transport. Overland routes are much less frequently encountered or discussed. Bronze Age monuments are often seen as existing outside settled landscapes, but hypothesized 'barrow roads' in some areas, imply that monuments were not so much placed outside settled places as they were located between them and along the way. This paper will use the idea of barrow roads to consider overland wayfaring in the Bronze Age, a period when some people may have traversed continents while others inevitably walked the same paths season after season, watching out for landmarks and following their sheep.

[168] *Chair*

Frierson, Andrew (Washington State University)

[184] *Lithic Technology and Other Archaeological Investigations of Rock Creek Shelter (35LK22)*

Excavations in 1967 at Rock Creek Shelter (35LK22), located within the Hart Mountain National Antelope Refuge in Lake County, Oregon, revealed a stratified record of frequent occupation that may potentially extend into the early Archaic. The artifacts recovered from the rockshelter include a chipped stone assemblage (n = 1307), cordage/basketry and other perishable material (n = 464), ground stone (n = 24), faunal remains (n = 1046), and numerous samples (n = 68). The lithic material, which consists of mostly obsidian, provides an opportunity to utilize X-ray fluorescence analysis to investigate important questions in the Northern Great Basin related to prehistoric land use, mobility, and the movements of populations including significant events such as the Numic expansion. This presentation will report on these analyses and the initial baseline study conducted that included an evaluation of the site stratigraphy and establishing a site chronology from radiocarbon dating and typological distinctive bifaces and perishable artifacts. The objective is that these analyses and site report will allow us to fit Rock Creek Shelter within the larger archaeological sequence of the Northern Great Basin.

Fries, Eric (UMAP) and John Morris (National Institute of Culture and History, Belize)

[243] *What Lies Between Two Regions: Settlement and Landscape Archaeology at the Aguacate Sites, Belize*

A series of exploratory surveys along the northern edge of the Belize River Valley in the area of the Aguacate lagoon has gradually revealed a surprisingly dense distribution of minor centers of the Classic Period Maya. These centers are situated in a zone of intersections, the nature of which shaped their presence in the landscape. Politically, the region lies at an interstice between the spheres of influence of several powerful, well-known polities. Geographically, the site complex is distributed across a transitional zone of ridges and wetlands that separates the Belize River Valley from neighboring regions. The location of this settlement system at the intersection of multiple types of spatial differentiation contributed to the development of an intensely heterarchical, tightly networked series of sites where local elites attempted to secure power and legitimacy through the deployment of a number of different elements of Maya architecture, cosmology and symbolic representation.

[243] *Chair*

Friesen, Max (University of Toronto) and Andrew Stewart (Strata Consulting, Inc.)

[35] *Covering Bones: The Archaeology of Respect on the Kazan River, Nunavut*

Complex relationships between people and animals define life in the northern past. For Inuit these relationships are manifested in many ways; particularly in practices that are often described as "showing respect" for animals, thus promoting stable relations between animal and human societies. Frustratingly, many of these activities, which are so prominent in the ethnographic record, have few archaeological correlates. Here, we examine one important practice with a relatively high level of archaeological visibility: the concealment of caribou bones under stones and in other inaccessible areas, thereby protecting them from dogs and other disturbances which could offend the caribou's inua. We examine this phenomenon at several important caribou crossings and elsewhere at inland Inuit archaeological sites on the Kazan River, southwest Nunavut, where we have mapped hundreds of features and collected bones from some of them. This research was performed in collaboration with Baker Lake community members who have direct knowledge of these localities, including aspects of bone disposal. Together, these studies reveal a cultural landscape in which the human-caribou relationship is omnipresent not just in terms of features relating to hunting and storage, but also with regard to the spiritual connection between these two interdependent categories of being.

Frink, Liam (University of Nevada Las Vegas)

[314] *Moderator*

Fritz, Sherilyn [95] see Weide, D. Marie

Fritz, Carole (CNRS) and Gilles Tosello (Maison des Sciences de l'Homme de Toulouse, CNRS)

[210] *Perception et analyse des scènes dans l'art paléolithique européen*

En art paléolithique, les "scènes" sont rares et leur identification repose le plus souvent sur la présence d'un acteur humain ou anthropomorphe. Paradoxalement, la thématique paléolithique compte moins de 5% de figures humaines pour 95% d'animaux. Cela signifie que la majorité des assemblages que l'on retrouve dans les grottes sont constitués d'images animales. Or dans nos cultures, l'image humaine est centrale et lorsque nous parlons de scène, nous recherchons intuitivement la référence à notre propre image. À l'évidence, cela ne semble pas avoir été le cas pour les cultures du Paléolithique supérieur. À la suite de ce constat, nous pensons que la reconnaissance et l'étude des scènes devraient s'appuyer sur d'autres critères d'identification. Des notions précisées et développées par la théorie de la Gestalt dans les années 1930 puis par les psychologues de la forme

contemporains nous offrent des outils analytiques. Les résultats d'une telle démarche nous orientent vers une interprétation mythologique de l'art des grottes dans laquelle l'image humaine n'est pas au centre du dispositif. Les exemples choisis dans les grottes ornées (Chauvet, Marsoulas et autres) illustreront notre propos

Fritz, Gayle J. (Washington University in St Louis)

[388] *Harvesting, Management, and Possible Cultivation of Chenopods (Chenopodium spp.) in the North American Southwest*

Chenopodium seeds are ubiquitous in archaeobotanical samples from sites across the U.S. Southwest, commonly interpreted as representing the harvest of wild populations or weedy plants that were encouraged to grow in garden plots and agricultural fields. Up to 75% of projects from various SW U.S. regions contained Chenopodium, and/or Amaranthus, and/or Cheno-am seeds. Archaeobotanists differ in how they recognize and report these seeds. At least 22 wild species of Chenopodium are native to one or more of the Four Corners states, and a detailed study of their seed traits would solidly ground any prehispanic domestication claim. We examine ethnographic and archaeological evidence for chenopod use by native Southwestern farmers that may—or may not—indicate their incorporation into active food production systems. We propose criteria of domestication such as: (1) morphological indicators (seed coat thinning, etc.); (2) archaeological evidence of increasing reliance on Chenopodium seeds over time, and/or their association with food storage loci of other known crops; and (3) plausibility arguments including apparent economic importance, the cultivation of similar species elsewhere, and ethnohistoric evidence of cultivation. Our discussion is framed by scenarios of early agricultural developments across the Desert Borderlands.

[388] Chair

Fruhlinger, Jake (Idaho National Guard)

[362] Moderator

Fu, Janling (Harvard University), Sherry Fox (Arizona State University), Rachel Kalisher (New York University), Kathryn Marklein (Ohio State University) and Adam Aja (Harvard University)

[252] *The Philistine Cemetery at Ashkelon: Funerary Remains and Mortuary Practice*

During the 2013–2016 seasons, an extramural cemetery was discovered at the coastal site of Ashkelon in Israel. Dated almost entirely to the Iron IIA period, more than 200 sets of remains were exposed and excavated, providing for the first time a secure and sizeable number of burials from which to generate an understanding of Philistine burial practices and mortuary ritual. The majority of bodies were found in primary inhumation with various depositional practices observed, among them simple pit, individuals covered with sherds, and cist burials, with both sexes represented and a dearth of infants. In this paper, we discuss the cemetery, the ceramic assemblage, and objects of personal adornment in order to help to shed light on these remains and the funerary practices that accompanied them in death. We then provide a short sketch of comparative material in order to situate the findings at Ashkelon within the southern Levant and the wider eastern Mediterranean world.

Fuentes, Agustin [191] see Kissel, Marc

Fuentes, Miguel

[56] *Settlement Pattern Transformation in the Arica Highlands during the Late Intermediate and the Late Periods (XIV–XV Centuries): The Role of Zapahuira and the Incan Tambo Network System and Its Relationship with Local Communities*

I will discuss the settlement pattern transformation of the Arica Highlands during the Late Intermediate Period and the Late Period (XIV–XV centuries) and the role of Zapahuira Tambo and the Inca Settlement Network System and its relationship with local communities. The latter will be carried out from an architectural and spatial characterization of some of the main Incan and Local settlements of the area. Some of the data integrated in this discussion have been gathered in my current research project in the area. The general objective of this paper can be summarized in this research question: What was the settlement strategy applied by the Inca in the Arica highlands and what was the role of local communities in the—construction—of imperial power? According to the above, several themes and complementary research questions can be raised such as:

- What are the main architectural and spatial characteristics of LIP and Incan settlements in the area?
- Is it possible to differentiate economic and social functions of LIP and Incan architecture?
- Is it possible to define the existence of an Inca Settlement Strategy for the Arica Highlands? If so, how did this settlement strategy compare to others settlement strategies applied in neighboring regions?

Fuenzalida Bahamondes, Nicole [231] see Swift, Jaime

Fukaya, Misaki (Nagoya University) and Nobuyuki Ito (Nagoya University)

[236] *Estudio cronológico de Chalchuapa, El Salvador a través del análisis cerámica del período Preclásico*

La cronología cerámica de Chalchuapa fue presentada en 1978 y actualmente se utiliza para reconocer los períodos chalchuapanecos. Sin embargo, se precisa la revisión de la cronología del mismo sitio, ya que en 2014 con gran cantidad de los datos por radiocarbono y análisis cerámico, se presentó una nueva cronología de Kaminaljuyu, la cual tiene una referencia importante con Chalchuapa. En el área de El Trapiche, Chalchuapa, con la tipología y estratigrafía se ha analizado la cerámica del período Preclásico encontrada. En el año de 2015 con las muestras encontradas se revisaron los fechamientos por C14. Se adquirió una nueva visión sobre los períodos Preclásicos de Chalchuapa. En esta ponencia se presentará el resultado del estudio cronológico.

Fukuhara, Hironori (Saitama University) and Tatsuya Murakami (Tulane University)

[293] *Living in Early Urban Center: Preliminary Results of the Tlalancaleca Archaeological Project, Puebla*

The archaeological site of Tlalancaleca was one of the largest urban centers in Central Mexico during the Middle to Terminal Formative periods (ca. 650 BC–AD 200/250). The site consists of a central plateau with civic-ceremonial cores and its surrounding areas, which are divided into the Northern Sector and the Southern Sector. Our research over five field seasons indicates that the urban landscape underwent significant changes through time, including initial urban growth during the Middle Formative, a grand-scale urban transformation during the Late Formative, and further expansion during the Terminal Formative. This paper presents preliminary results of mapping, ground survey, surface collection, manual auger probe, and excavations, which were carried out at the Northern Sector of Tlalancaleca. Preliminary analysis suggests that there was an extensive occupation in the peripheral areas during the Terminal Formative (ca. 100 BC–AD 200/250). The paper discusses the process of urban expansion, socio-spatial organization, and the use of public space in residential areas along with implications for regional sociopolitical processes during this dynamic period in Central Mexico.

Fulkerson, Tiffany (Washington State University) and Shannon Tushingham (Washington State University)

[300] Historical Ecology and Management of Marine Estuaries: Paleoethnobotanical and Fine Grained Constituent Results from the Manila Site (CA-HUM-321), Humboldt Bay, Northwestern California

The Manila site (CA-HUM-321) is a stratified prehistoric midden site with a long history of use by the Wiyot people. This study, the first of its kind from Humboldt Bay, reveals the results of constituent analyses of excavated materials. Fine-grained analysis of dietary residues from Manila reveals the earliest documented (1309 cal BP) evidence of mass harvested foods, smelt fishing, and intensive shellfish procurement on the North Coast of California. Paleoethnobotanical analysis of seeds and wood charcoal provides evidence for potential range management techniques involving intentional vegetation burning. This is suggested by the diversity and ubiquity of wood taxa commonly selected as fuel sources in the ethnographic record coupled with the high representation of seeds in the grass (Poaceae) and bean (Fabaceae) families. These findings are congruent with ethnographic accounts of intentional vegetation burning by the Wiyot which was done to enhance the availability and productivity of numerous plant and animal resources. The results of this study suggest that intensification of coastal and estuarine environments occurs earlier than previously thought in the region and provides insight into the emergence of landscape management, bulk storage, and mass capture techniques associated with the development of plank house villages in northwestern California.

Fuller, Benjamin (University of Chinese Academy of Sciences), Yang Xia (University of Chinese Academy of Sciences), Jinglei Zhang (University of Nanjing), Tingting Wang (University of Chinese Academy of Sciences) and YaoWu Hu (University of Chinese Academy of Sciences)

[30] Investigating Breastfeeding/Weaning Practices and Adult Mobility Patterns during the Western Zhou Dynasty (1122–771 BC) at Boyangcheng, Anhui Province, China

In a first for Chinese archaeology, breastfeeding/weaning practices were investigated at the Western Zhou Dynasty (1122–771 BC) site of Boyangcheng, Anhui Province. Ribs and long bones were analyzed to examine short and long term dietary changes in each individual. The adult $\delta^{13}C$ and $\delta^{15}N$ results indicate that mixed C3 (possibly rice) and C4 (millet) terrestrial diets with varying levels of animal protein were consumed. The elevated subadult $\delta^{13}C$ and $\delta^{15}N$ results reflect that solid foods were introduced to the infant's diet before the age of 2 years and that cessation of breastfeeding occurred predominately between 2 and 3 years of age and no later than 4. Individuals between 2 and 10 years old, with lower $\delta^{13}C$ and $\delta^{15}N$ results than the adult mean, possibly had a more plant-based diet with reduced amounts of animal protein during childhood. The isotopic offsets between ribs and long bones revealed that five adults experienced radical dietary shifts in their later lives; all switching from predominately C4 to C3 diets. Based on historical and archaeological evidence of the Jianghuai region (where Boyangcheng is located) these individuals could have been Dongyi migrants from the Shandong region of northern China.

Fuller, Dorian Q. (University College London) and Chris Stevens

[177] Low Intensity Cultivation and Domestication: Pathways to Millet Domestication in India and China

The steppe zone of northern China and the savanna zones of India both produced indigenous domestication of numerous small-grained Panicoid cereals, i.e., millets. This presentation will explore parallels in the processes of domestication of these crops, including comparisons of ecological characteristics of wild progenitors, the seasonal mobility of early cultivators, and shared domestication traits and the current state of their documentation in archaeobotanical evidence. Millets for the most part lent themselves to low intensity forms of cultivation, indicated for example by high levels of grain immaturity, and short seasonal labor investments that fit well with seasonal population dispersal and cache storage. Nevertheless, parallels in the evolution of non-dormant, larger grains, and more communal systems of storage and processing can all be inferred from the limited available archaeobotanical evidence. This contrasts with the more intensively managed, and often household focused processing of early large-grained cereals such as rice and wheat.

[388] Discussant

Fuller, Dorian Q. [21] see Gonzalez Carretero, Lara

Fuller, Dorian Q. [27] see Stevens, Chris

Fulton, Kara A. (University of South Florida)

[253] Moderator

[6] Discussant

Funk, Caroline (SUNY University at Buffalo), Debra Corbett (Nanuetset Heritage) and Brian Hoffman (Hamline University)

[194] Multigenerational, Multipurpose Landscapes and Seascapes in the Western Aleutian Islands

The landscape and seascape surrounding tiny Corvie Bay (400 m wide) on southern Kiska Island in the western Aleutian Islands were occupied by the Qaʕun for 3,000 years. During their use of the area, they transformed the surrounding seas and lands from narrowly defined water tracks and lightly encamped places to deeply imbued, intensively inhabited, and probably owned sea and land spaces. This same pattern of imbue, use, and ownership was reenacted throughout the western Aleutians over the past 6,000 years. Our intensive survey of the peninsulas surrounding Corvie Bay in 2014 revealed a diverse suite of village, camp, and nonutilitarian feature clusters. Few of the clusters were occupied simultaneously and all would have been visible to later occupants of the area. The archaeological record of the Corvie Bay area offers evidence for complexly accreting history, but little explanation. Because the Qaʕun were ancestral Aleut/Unangan people, traditional Aleut stories offer sources for hypotheses about the changing meaning of landscapes and seascapes across generations.

Funk, Caroline [257] see Howard, Joshua

Funkhouser, J. Lynn [142] see Porth, Erik

Fuqua, Kaitlyn (University of Alaska Fairbanks)

[91] Morphological and Functional Analyses of Northern Archaic Side Notched Bifaces

The Northern Archaic tradition (6000–1500 years BP) represents one of the longest cultural continuities in central and northern Alaska, characterized through continuity in lithic technology, basic settlement, and subsistence patterns. However, this tradition does not have clearly defined characteristics and is commonly used to describe any site in central and northern Alaska with side notched bifaces present in the tool assemblage. Few studies have been performed on the morphological and functional traits of Northern Archaic side notched bifaces, despite their prevalence in the archaeological

record in Alaska. This poster presents morphological and functional analyses performed on over 300 side notched bifaces from 107 sites assigned to the Northern Archaic Tradition, across central and northern Alaska. Variation in tool shape was measured using geometric morphometrics, and landmark placement designed to characterize basal morphology allowed the analysis to include tool fragments. Functional analyses included macroscopic use wear and examination of impact fractures. This exploratory study examines Northern Archaic tool kit variation and risk mitigation strategies related to technological continuity and diversification, as well as a spatial examination of Northern Archaic sites across Alaska.

Furquim, Laura [62] see Shock, Myrtle

Fusaro, Agnese [356] see Angourakis, Andreas

Fux, Peter [156] see Fecher, Franziska

Gabe, Caroline (University of New Mexico)

[390] *Fine Dining in the Borderlands: Exploring Spanish Colonial Group Identity in Seventeenth-Century New Mexico*

Previous research on seventeenth-century Spanish settlers in New Mexico has concluded that the colonists were composed of a population that blended Spanish and indigenous Puebloan groups genetically and culturally, which is often described as mestizo. However, there is no single, consistently used definition of mestizo or its archaeological expression. Furthermore, defining a population as mestizo ignores individual and household formulations of identity. So, what, if anything, united seventeenth-century Spanish colonizers as a group? This paper uses patterns in material culture to better understand expressions of identity. Eating behaviors are one universal marker of inclusion. They are a way groups delineate boundaries. This paper uses diet, food preparation, and serving techniques as identity proxies. Focusing on the ceramic and faunal assemblages at 13 households dated to the seventeenth century, results point to a more complex view than expected. While known access to Spanish imports and interaction with contemporary households have no statistically significant effect on culinary practices, the socioeconomic status influences the proportions and diversity of materials at a household. This implies a possible set of traits tied to group identity, which are in fact a blend of Spanish and Native traditions.

Gabler, Brandon (HDR, Inc.)

[287] *Survey Intervals and the World of Section 106: Eligible Site Size As a Factor in Survey Design*

Cultural resources management companies are routinely caught between a proverbial rock and a hard place in NHPA Section 106 compliance projects. On one hand, SHPOs prefer to evaluate a project based on the results of 100% survey at their preferred survey interval, often requiring shovel testing at 15 m intervals or closer (especially in the eastern United States, where surface visibility is typically low), in order to identify all archaeological sites, whether they end up eligible for the NRHP or not. On the other hand, clients prefer lowest cost, fastest schedule proposals, whether realistic or not. Somewhere in the middle, the federal requirement simply states that the lead agency makes a reasonable and good faith effort to take into account the potential effects on NRHP-eligible/listed historic properties. In this discussion, the author explains that the ideal survey interval and strategy should take into account the likelihood of identifying sites that are eligible for listing on the NRHP, through the use of variables that have been considered in the past—survey transect interval, testing grid pattern, shovel test diameter—in addition to variables that must be considered on their own merit, namely the typical dimensions of sites that are eligible for listing on the NRHP.

Gaggio, Giacomo (University of California, San Diego.) and Paul Goldstein (University of California, San Diego.)

[174] *Ceremonial and Psychotropic Plants of the Tiwanaku (AD 500–1000): New Evidence for Erythroxylum coca and Anadenanthera colubrina from the Omo Temple in Moquegua, Peru*

The consumption of psychotropic substances is a ceremonial practice widespread worldwide since antiquity, however, archaeological evidence for the role of plants in rituals is scarce and interpretations are mostly derived from ethnographies and iconography. Among other methods of analysis, Paleoethnobotany is one of the most indicated for the finding of micro and macro remains involved in ceremonies. This paper presents the results of a Paleoethnobotanical analysis conducted at the site of Omo M10A, a Tiwanaku Temple located in the Moquegua Valley, in Southern Peru, built and in use during the Middle Horizon Period (AD 500–1000). The analysis of field-screened remains and soil samples from floor contexts and features revealed the presence of Erythroxylum Coca and Anadenanthera Colubrina, two plants known to be central in ancient Andean rituals, demonstrating how Paleoethnobotany is essential for a complete understanding of ceremonial contexts in archaeology. This paper evaluates deposits, artifacts and ecofacts associated with these rare finds, shedding new light on Tiwanaku rituals in the lowlands.

Gagnon, François (Université du Québec à Montréal) and Dagmara Zawadzka (Université du Québec à Montréal)

[175] *Places, Paths, and Territories: Exploring the Multifunctional Nature of Northeastern Ontario Rock Art*

The rock art of northeastern Ontario is less well-known than its counterpart in northwestern Ontario. However, recent explorations of the numerous lakes and meandering rivers in the Canadian Shield have led to the identification of previously unknown sites, as well as to the proper documentation of previously known sites, thus increasing greatly the sample and allowing for the emergence of a more complex regional picture. As an example, the rock art of Temagami area is discussed. This large concentration of pictograph sites has enabled a rare regional study through which the multifunctional nature of rock art was revealed, as well as a gamut of sites ranging from private to public was identified. Rock art sites were sacred places. They were strongly associated with travel routes often acting as a landmark and a liminal place in a journey where the assistance of other-than-human persons could be solicited. Some prominent sites were suited for rituals where social boundaries were negotiated between the local Teme-Augama Anishnabai and non-band members. As an element of the animic landscape that served simultaneously a number of social and spiritual functions, rock art helped to structure relationships between people, other-than-human persons and places.

Gaignerot-Driessen, Florence (Humboldt Foundation/University of Heidelberg)

[136] *Old Deities for New Men? The Social, Cultural, and Political Role of Religion and Ritual Practices during the Late Bronze Age/Early Iron Age Transitional Period on Crete*

It is generally assumed that the Minoan Goddess remained venerated on Crete after the destruction of the Minoan and Mycenaean Palaces. In the Late Bronze Age, in the aftermath of the collapse of the palatial system, freestanding bench sanctuaries housing large terra-cotta female figures with uplifted arms and their ritual vessels appeared in a series of newly founded Cretan sites. Since their typical gesture recalls Minoan scenes allegedly representing the epiphany of a female divinity, these figures have traditionally been interpreted as a survival of Minoan cult practices and labeled “Goddesses with Upraised Hands.” However epigraphic, iconographic, technological, and archaeological evidence makes this assumption questionable. This paper aims showing that they most likely represented votive offerings emblematic of emerging social groups. On the basis of this hypothesis, the reference to

ancient cult motives in a new religious system is considered. In a more general sense, the Cretan case is used here to evaluate the role of religion in shaping a new social order and political organization during a period of transition.

Gaikwad, Nilesh [5] see Powis, Terry

Gajewski, Konrad [227] see Martindale, Andrew

Galaty, Michael [287] see Wilemon, Billy

Galeev, Philipp [298] see Beliaev, Dmitri

García Rodríguez, Ana Karen

[267] *The Precolumbian Sculptures After the Conquest: Reutilization and Re-Significance in Amecameca, Mexico*

The town of Amecameca is located in the southwest of Mexico City, near the volcanoes Popocatepetl and Iztaccíhuatl. Its origin dates back to precolumbian times. The city was part of Chalco empire, which was known for its artisans who made extraordinary sculptures. Over time, many of these sculptures have disappeared, mainly by the destruction of the Spaniards during the conquest. Currently, there are few examples of sculptures from Amecameca in the museums. Despite this, some inhabitants have reused the sculptures that have been accidentally located in their homes or farmlands. We can see examples of this in the facades of colonial buildings and modern houses around the entire city. In this paper, I will analyze a group of sculptures which are embedded to the buildings of the city of Amecameca. I will study these pieces through their iconographic elements, trying to elucidate its symbolism. The principal goal of this work is to show the new meaning of precolumbian sculptures in the modern imaginary of the inhabitants of Amecameca.

Galindo Cumplido, Selene Yuridia (Escuela Nacional de Antropología [ENAH])

[352] *When the Desert Meets the Sea: The Annual Journey of Quitovaquenses to the San Jorge Beach as a Community of Practice*

This paper presents an ethnographic account of the people of Quitovac, Sonora's yearly journey to the sea. The village is set amid the Altar desert. Every year the people of this town take a trip to the Sea of Cortés and make the shore a very special place. I present this account from the perspective of communities of practice emphasizing how the activities they undertake are the result of a continual interaction between people and places and between the distinct actors present. I also take into account the ephemerality of the material remains of such an important ritual that leave scarce evidence of its importance. This interplay gives particular meaning to the encounter with the sea that result in reinforcement of community identities. Moreover, the details of dwelling at the sea are maintained and passed on through this yearly practice to folks that carry out their daily existence in their village in the desert.

Gallaga, Emiliano (EAHNM)

[201] *The Macaw from Cueva de Avendaños, Chihuahua*

At the beginning of 2016, an EAHNM archaeologist performed a rescue project in the Cueva de Avendaños, municipality of San Francisco de Borja, Chihuahua, as a result of a complaint. There, the land owner decided to level the cave surface with a bulldozer not knowing that an archaeological site lay beneath. The result was the destruction of a prehispanic funerary context which included the remains of at least three mummified individuals accompanied by textiles, basketry, string, leather, shell and a mummified military macaw. Unfortunately, only the head of the macaw was preserved. This presentation will focus on the macaw remains and the importance of this animal in the prehispanic world, especially because is the first evidence of this species outside the site of Paquimé in northwest Mexico.

[201] *Chair*

Gallaga, Emiliano [201] see García Vilchis, Tobías

Gallagher, Steven (Faculty of Law, Chinese University of Hong Kong)

[139] *The Lost Dead of China: Why Does Hong Kong Retain the Unowned and Unclaimed Dead from the Chinese Diaspora of the Nineteenth and Twentieth Centuries?*

The nineteenth- and twentieth-century Chinese diaspora directly contributed to the economic and social development of many nations in the Asia-Pacific region. It also had one unforeseen effect as many if not most Chinese who traveled overseas to seek safety or economic gain for themselves and their family had a deep-rooted desire to have their corpse returned for burial to their home village in China, as evidenced by the wreck SS Ventnor whose hold carried the remains of almost 500 Chinese from the New Zealand gold fields. This paper considers the Chinese customs and traditions of returning the dead to their home villages, the history of the development of co-operative societies and charities which paid for the repatriation of the dead to home villages and why these were centered on Hong Kong. The paper considers the historical incidents in the history of China that resulted in the repatriation of human remains becoming so difficult that "Coffin Rooms" intended for temporary storage of corpses have become more permanent resting places. The paper concludes with a consideration of the issues of legal ownership, duties of disposal and privileges that may be consequent from this assumption of temporary stewardship of the dead.

Gallagher, Daphne [161] see Dueppen, Stephen

Gallardo, Francisco [134] see Pestle, William

Gallardo, Francisco [134] see Vidal Montero, Estefania P.

Gallareta Negrón, Tomás (INAH)

[67] *Discussant*

Gallareta Negrón, Tomás [243] see Ringle, William

Gallareta Negrón, Tomás [101] see Seligson, Ken

Galle, Jillian (Digital Archaeological Archive of Comparative Slavery, Monticello) and Lynsey Bates (Digital Archaeological Archive of Comparative)

[317] *"Jouer sur du velours": Archaeological Evidence of Gaming on Sites of Slavery in the Caribbean and United States*

Hand-carved ceramic discs excavated from historic-period sites across North America and the Caribbean suggest the widespread growth of gaming culture during the third quarter of the eighteenth century. From Spanish missions and French forts to villages of enslaved people across the British, French, and Spanish colonial domains, people fashioned discs from flat portions of ceramic vessels for use in a variety of games. We begin by exploring the production and use of hand-carved ceramic gaming discs of over 60 sites of slavery in North America and the Caribbean. Significant regional differences in gaming practices are revealed through a fine-grained analysis of disc attributes and a comparison with other manufactured gaming pieces such as dice and dominoes. We then focus on gaming among enslaved laborers in the Caribbean, with a close look at the exceptional assemblage of ceramic gaming discs from the Morne Patate Village on Dominica. Our analysis indicates a preference for refined earthenware vessels within a specific thickness range and decoration that could produce discs with decoration on one side, which could effectively result in "heads" and "tails."

Galle, Jillian [370] see Bloch, Lindsay

Gallegos Gomora, Miriam Judith (Centro INAH Tabasco), Ricardo Armijo Torres (Centro INAH Tabasco) and Manuel Acosta Alejandro (Division Academica De Ciencias Basicas—UJAT)

[349] *Los rituales funerarios de Comalcalco desde la perspectiva del siglo XXI*

Situado a 2600 metros al noreste de Gran Acrópolis de la ciudad de Comalcalco, Tabasco se descubrió un gran depósito funerario que incluyó 51 urnas funerarias, 115 esqueletos humanos y un cánido. Además, se identificaron cuatro horadaciones en el suelo que aparentemente sólo presentaban tierra en su interior. Los análisis de la muestra esquelética han permitido conocer mayores características físicas de la población que residió en la periferia del asentamiento, pero en especial conocer algunos rasgos particulares de los rituales funerarios efectuados alrededor del 660 dC. Esta ponencia aborda una interpretación inicial del contexto funerario, con énfasis en los estudios arqueométricos aplicados a las horadaciones. Estas últimas, aunque son semejantes a los hornos de hoyo utilizados para la manufactura de figurillas y vasijas de pasta fina, en este contexto en particular parecen haber tenido otra función

Gamble, Abigail [75] see Berquist, Stephen

Gamble, Lynn (University of California, Santa Barbara)

[168] *Ceremonial Practices, Feasts, and Persistent Places: A Ritually Mounded Landscape Constructed by Hunter-gatherers in Southern California*

Shell mounds have not been recognized as prominent ritual features in southern California, despite evidence to the contrary. The largest extant shell mound in the region is on Santa Cruz Island, measures 270 by 210 m (roughly 45,000 m² in area), is 8 m higher than the terrace it rests on, is covered with 50 house depressions, and dates to 6000–2500 BP. In the 1920s, three cemeteries were excavated at the top of El Montón; one young woman stood out among the over 200 individuals in that she was buried with 157 stone effigies. Analysis of multiple lines of evidence, including stratigraphic profiles of features, 85 radiocarbon dates, ground-penetrating radar, and mortuary data, support my claim that the mound was a persistent place where early visitors had significant feasts, constructed dwellings, buried their dead, and performed ceremonies where select groups of infants, children, and adults were revered. These mortuary rites conveyed the symbolic power of the place and created a history of events that became part of a mythical and real past that was repeatedly visited, modified, and interpreted as social relationships were reinforced. This study supports the idea that shell mounds are socially constructed landscapes, not just accumulations of refuse.

Gambrell, Natasha [141] see Sebastian Dring, Katherine

Gangloff, Deborah

[206] *Discussant*

Gann, Doug [59] see Milliken, Ian

Gao, Xing [113] see Peng, Fei

Garay, Alejandro [298] see Beliaev, Dmitri

Garber, James [370] see Bentley, Heath

Garcia, Alejandro (Escuela Nacional de Antropología e Historia) and Gustavo Nieto Ugalde (Tula Region Interaction and Migration Project (TRI))

[120] *Resultados recientes sobre la prospección del Cerro Magoni*

Cerro Magoni es un sitio relativamente desconocido que está ocupando un lugar cada vez más importante en la explicación del origen del Estado tolteca. Crespo y Mastache realizaron los primeros trabajos de prospección a finales del siglo pasado y concluyeron que se trataba de un sitio menor, con una ocupación efímera durante el Epiclásico y una mayor durante los años del esplendor de Tula. Investigaciones más recientes han mostrado que el sitio tiene una extensión mayor a la originalmente prevista, y una ocupación de al menos 300 años. Esta presentación trata sobre los resultados preliminares del recorrido de superficie que se llevó a cabo en Cerro Magoni en el verano de 2016. Lo que en un principio se pensó que podía ser una

tarea breve, se prolongó durante toda la temporada por la gran cantidad de hallazgos arquitectónicos tanto en las laderas como en la cima del Cerro. La integración de los datos en un sistema de información geográfica permitió un acercamiento a la densidad y diversidad de los hallazgos. Los resultados no dejan duda alguna sobre la importancia del sitio y el gran reto que implica continuar con las investigaciones.

Garcia, Arnau (Institute for European and Mediterranean Archaeology, University at Buffalo), Hector A. Orenge (McDonald Institute for Archaeological Research), Athanasia Krahtopoulou (Hellenic Ministry of Culture & Sports, Ephorate of) and Anastasia Dimoula (Department of History and Archaeology, Aristotle U)

[250] *The Kambos Project: Remote Sensing Applications and Archaeological Approaches for the Reconstruction of the Disappeared Cultural Record of the Western Thessalian Plain*

The Thessalian Plain has been at the fore of Neolithic research in Greece and Europe since early twentieth century exploration in the area which documented an intensively occupied landscape during both Prehistoric and Historical periods. Despite the Thessalian Plain's potential for archaeological research, western Thessaly has provided scarce evidence of occupation. This might be related to the extensive modifications it has been subjected to during the last 45 years. These have rendered the Western Thessalian landscape sterile for the application of standard archaeological remote sensing techniques (such as multispectral imaging) and other extensive survey methods. The combination of its long occupation history and highly modified landscape make Kambos an excellent study area to develop and test new methodologies for prospection, analysis and reconstruction of past landscapes. In this paper new methodological approaches employing photogrammetry-based landscape reconstruction and multi-temporal image analysis combined with pedestrian surveys will be presented and their results discussed. The location of more than 250 new archaeological features attests to the immense potential of the Western Thessalian Plain and provides new important information on the prehistoric and historical periods of the area.

Garcia, Damian (Acoma Historic Preservation Office) and Kurt F. Anschuetz (Rio del Oso Anthropological Services/Acoma Tribal)

[34] *Movement as an Acoma Way of Life: An Archaeology of the Pueblo's Pathways and Impressions*

Throughout its history, the Pueblo of Acoma has been a community on the move. Even after having located their promised homeland—Haak'u, the "place prepared"—at the conclusion of a journey that began at Shipap, the "place of emergence," Acoma's people have continued to move. With Sky City at its center, the people have engaged with their landscape in choreographed seasonal, interannual, and multigenerational movements informed by three tenets of Acoma's traditional stewardship: Rest, Renew, and Reuse. As such, archaeological traces of Acoma's movements represent the "footprints," "fingerprints," and "impressions" of the "living, sacrifice, and history" of Acoma's cultural heritage.

Garcia, Johan (University of Kent—Universidade do Porto)

[135] *Indigenous Copper Production in Colonial Mexico (1533–1630)*

During the entire colonial period, the south-central region of Michoacán, Mexico was the main producer of copper in New Spain and one of the most important loci of production in the whole Spanish empire. Copper was a fundamental material for artillery, coinage and silver extraction, not to mention its importance in the manufacture of all sorts of daily life items. However, Spanish colonizers had an almost complete lack of copper extraction knowledge. On the other hand, the region had a natural occurrence of rich ore deposits and a well-established indigenous metallurgical tradition based on copper developed during the course of eight centuries. These set of factors led the Spaniards to heavily rely on native knowledge, technology and labor. This paper will focus on the social and technological aspects of copper metallurgy during the contact and early colonial periods of Mexico, and how the specialized communities of indigenous metallurgists and their traditional technology had an important role in the development of the colonial economy as key suppliers of strategic materials and objects. Furthermore, this paper aims to approach the changes suffered by these communities with the shift of the productive paradigm and the encounter with the European technology.

Garcia, Jorge (University of Florida Department of Anthropology)

[220] *Social Inequality as Reflected in Dietary and Mobility Practices of South American Maritime Chiefdom Societies: Contextual and Isotopic Analysis of Burials Excavated in La Tolita, Ecuador*

This project explores social inequality in relation to dietary and mobility practices of maritime Pacific polities in La Tolita (600 BC–AD 200) of Ecuador and Colombia. The research question driving this project aims to identify: How is social inequality reflected in the diet and spatial mobility as practiced by maritime chiefdom societies through time and space? A cross-site comparison between the dietary and mobility practices of individuals buried in mounds associated with the chiefly class to individuals buried in shallow/mass graves at the site of La Tolita will be assessed to test if variables including time, space, age, sex, and/or social inequality influenced these aspects of life. In addition, a statistical analysis of mobility patterns will be conducted to distinguish the degree of spatial mobility by individuals in relation to social class and the variation of their dietary practices (e.g., luxury-non-luxury foods). Material and human remains recovered from excavated burials in La Tolita, indicating a variable population (e.g., age, sex, rank, time period), will be examined through a distributional and contextual analysis, complemented by an isotopic analysis of human bone and teeth to assess the paleodiet (15N/14N, 13C/12C) and individual's degree of mobility (87Sr/86Sr, 16O/18O).

García, Josué [337] see Balcarcel, AnaBeatriz

Garcia, Louie [60] see Gearty, Erin

García-Albarido, Francisco (Graduate Student, Department of Anthropology, Colorado State University)

[331] *Arqueología de los repartos mercantiles en los Andes coloniales: endeudamiento, elites locales y cultura material.*

La colonización de los Andes representó una oportunidad de enriquecimiento individual para peninsulares, criollos y nativos. Esto se logró mediante el mercantilismo forzoso de productos europeos y americanos, promovido por mercaderes limeños y tempranamente ejecutado por los corregidores (entre otros). El reparto de mercaderías a precios excesivos generó el endeudamiento forzado de las comunidades nativas. En muchos casos, los curacas también buscaron beneficiarse de esta práctica, colaborando activamente en el reparto. De esta manera, la cultura material fue conscientemente utilizada para la generación de deudas y la consolidación de posiciones de dominación económica. Las grandes rebeliones de la década de 1780 terminaron con los repartos. Proponemos que esta importante práctica generadora de asimetría económica debe ser estudiada desde sus vestigios materiales y una detallada discusión historiográfica de la cultura material utilizada. Estos objetos se encuentran en depósitos domésticos y como parte de ajuares funerarios indígenas. Algunos son claramente exóticos mientras otros son normalmente asociados a actividades cotidianas. Proponemos la arqueología de los repartos mercantiles como una manera de analizar la consolidación de elites y asimetrías locales. Consideramos como caso de estudio sitios coloniales del Corregimiento de Atacama (Alto Perú) y discutimos el potencial comparativo de este tipo de arqueología.

García Chavez, Raul E. and David Arreola (Instituto Nacional de Antropología e Historia)**[288]** *Los Togados de Mariposa en las Figurillas de la Fase Coyotlateleco de la Cuenca de México*

Durante el Clásico, las figurillas Teotihuacáneas, han sido consideradas representaciones de deidades. Recientes estudios, se han enfocado sobre la posibilidad de que esas figurillas representen retratos de altos dignatarios, como gobernantes o guerreros, y cuyas imágenes habrían sido veneradas como parte de una ideología de estado. Las figurillas despliegan una gran variedad de “togados” entre los que destacan los de mariposas, que se asociarían con altos dignatarios y el poder político. Con la destrucción de Teotihuacán el sistema político y religioso, se desintegró. Unos años después de la destrucción, durante la fase Coyotlateleco (600–800 dC), los nuevos pobladores de la Cuenca de México retomaron algunos de los viejos emblemas Teotihuacáneos, para ser usados por sus dirigentes, un contexto de fragmentación política, muy diferente al del lapso de poder del periodo clásico Teotihuacano.

García-Des Lauriers, Claudia (California State Polytechnic University, Pomona)**[201]** *Cave Myths Past and Present: Cerro Bernal as a Sacred Landscape*

In the municipality of Tonalá, Chiapas, Cerro Bernal represents a unique feature on the Pacific coastal plain—one that is both strategic and of economic importance as well as representing a deeply potent sacred landscape. Among the important features of this landscape that have become the focus of contemporary folklore are a series of caves, or more specifically rockshelters, that have entered the imagination of local residents as important elements of a living and enchanted landscape. However, upon further research it is not difficult to see how these contemporary myths embody ideas that have a precolumbian origin. The conception of Cerro Bernal as an enchanted landscape has very ancient roots, at least going back to the Early Classic, and perhaps earlier. This paper explores the importance of caves in the conception of Cerro Bernal as a place on the landscape—both real and conceptual on the Pacific Coast of Chiapas.

García Ferrusca, Víctor Hugo (Centro INAH Sonora) and Alejandra Abrego Rivas (Centro INAH Sonora)**[91]** *Las puntas de proyectil de las planicies costeras de Sonora, del desierto al bosque espinoso*

Durante los trabajos de excavación y recorrido de superficie en el Proyecto de Salvamento Arqueológico Gasoducto Puerto Libertad-Frontera Estatal, llevado a cabo en Sonora, México, se ha recuperado una numerosa muestra de puntas de proyectil sobre un área que cubre cerca de 600 kilómetros lineales, desde Puerto Libertad, en la costa noroeste del estado, hasta el límite con Sinaloa. Estas puntas están afiliadas a determinados contextos en diferentes periodos, como el arcaico, el de agricultura temprana, prehispánico y posterior y atestiguan la larga trayectoria ocupacional en el territorio sonorense. El estudio de los materiales mencionados contribuye a la integración de una tipología regional más amplia, donde se incluyen morfologías recurrentes que no han sido establecidas como Tipos; también, traza la distribución espacial de los Tipos ya existentes y aporta datos sobre la adaptación de los grupos humanos a las transformaciones del entorno. Se presenta el resultado del análisis realizado a las puntas de proyectil.

García-Granero, Juan José [274] see Lancelotti, Carla

García Guerrero, José María [252] see Medina Martínez, Lorena

García-Plotkin, Patricia (Agua Caliente Band of Cahuilla Indians)**[295]** *Moderator***García Sánchez, Jorge, María Elena Suárez Cortés (Tula Region Interaction and Migration Project) and Destiny Crider (Luther College)****[120]** *Estudio comparativo de la cerámica epiclásica de la región de Tula: Cerro Magoni, Tula Chico, y La Mesa*

El presente trabajo se enfoca en un estudio comparativo que se enfoca en los atributos formales de la cerámica proveniente de contextos arqueológicos en tres sitios epiclásicos de la región local de Tula, Hidalgo conocidos como La Mesa, Tula Chico, y el Cerro Magoni. El objetivo del estudio es obtener un primer acercamiento a las pautas de interacción entre los sitios y entender el panorama social que prevalecía en la región local. En este ensayo, consideramos las particularidades del tipo ampliamente conocido como Coyotlateleco, que hasta ahora ha sido considerado como elemento cultural compartido entre las tres comunidades. Evaluamos una hipótesis alternativa que pronostica diferencias en cuanto a la prevalencia de distintos rasgos formales de la cerámica Coyotlateleco encontrada en cada uno de los sitios. El fin estratégico del estudio es juntar el análisis de varios tipos cerámicos al estudio actual para trazar las pautas de intercambio económico y social entre los sitios y así investigar las relaciones sociales y políticas que existieron entre las comunidades durante el Epiclásico.

García Vilchis, Tobías (Professor) and Emiliano Gallaga (Doctor)**[201]** *The Cave Dwellers of the Sierra Tarahumara*

The Raramuri, an indigenous people from Chihuahua, Mexico, has occupied the western part of the country for over 1,000 years. As many authors claim, their ways of life have changed little, and they remain as one of the only, if not the only, living seminomadic groups existing in North America. In this paper, we will focus on recent ethnoarchaeological research carried out by students and professors of the EAHNM. This research allows us to create an explanatory model to comprehend the nature of the archaeological record produced by other seminomadic groups from Chihuahua and the North American Southwest.

Gardeisen, Armelle [378] see Speller, Camilla

Gardner, A. Dudley (Western Wyoming College) and William Gardner (WAARI)**[184]** *A Comparison of Lithic Types from a Multi-Stratified Site in West Central Colorado (13,000–3,000 BP)*

This presentation will focus on the analysis of Projectile Points recovered in excavation at Eagle Rock Shelter that date from 13,000 to 3000 BP. Eagle Rock Shelter is located in west central Colorado on the east side of the Gunnison Gorge. Eagle Rock contains occupation horizons dating from 13,000 to 150 BP. The shelter contains a full range of projectile points dating from the Paleo to Protohistoric Period. In this presentation we will examine some of the size, shape, and structural traits of projectile points noted in the horizons that date from the Paleo to the Middle Archaic period at the site. We will emphasize what we consider to be distinctions in the projectile point assemblage at the site and briefly compare the projectile points to other similar dated points found in the region.

Gardner, Karen (GEI Consultants, Inc.), Eric Bartelink (California State University, Chico), Antoinette Martinez (California State University, Chico), Alan Leventhal (San Jose State University) and Rosemary Cambra (Chairwoman of the Muwekma Ohlone Tribe of the San)

[30] *Reconsidering Stable Isotope Analysis of Bone Collagen for the Interpretation of Prehistoric Breastfeeding and Weaning Practices: A Case Study from Santa Clara Valley, California*

Breastfeeding and weaning practices (BWPs) are deeply personal, influenced by individual choices, circumstances of health and opportunity, community support, and cultural norms. This presentation will discuss the advantages and challenges of using bone collagen composition to interpret breastfeeding and weaning practices, using data from the Yukisma Mound (CA-SCL-38), a Late Period (~740–230 BP) ancestral Ohlone mortuary site in Santa Clara County, California. Stable carbon and nitrogen isotope values from bone collagen are available for 202 individuals from this population, including 24 subadults. A statistical approach, using linear regression and standard residual values, provides an objective method for differentiating breastfeeding infants from nitrogen enrichment due to consumption of other food sources (e.g., marine foods). Results are consistent with contemporaneous regional studies which used serial sampling of collagen from tooth dentin, but differ from ethnohistoric accounts of Ohlone breastfeeding practices from the eighteenth century. Possible explanations for the change through time will be discussed in historical context.

Gardner, William [184] see Gardner, A. Dudley

Garfinkel, Yosef [22] see Carter, Tristan

Garland, Carey (University of Georgia) and Laurie Reitsema (University of Georgia)

[223] *Early Life Stress at the Late Prehistoric/Early Contact Site of Fallen Tree: Combining Enamel Defects and Incremental Isotope Analysis of Dentin to Explore Nutrition as a Source of Stress*

This study examines internal enamel micro-defects and incremental isotopic data from tooth dentin to reconstruct early life stress and dietary histories of Gule individuals interred at the Late Precontact/Early Contact period site of Fallen Tree (AD mid-1500s) on Saint Catherines Island, Georgia. Fallen Tree presents a new point in the chronology of indigenous biocultural adaptation to Spanish missionization in the southeastern United States.

Missionization is associated with increased skeletal stress due to novel infectious diseases, population aggregation, and changes in diet, such as increased reliance on maize. However, diet should not simplistically be equated with nutrition. By comparing incremental isotopic data from tooth dentin with the enamel defect record, nutrition as a source of stress can be explored, especially early life stress associated with the transition from breast milk to solid foods. Results reveal that 79% of individuals exhibit at least one defect, with an average of 2.6 defects/individual. Stress chronologies show that individuals experienced the highest frequency of stress events during their second year of life. Carbon and nitrogen isotope data from incrementally sampled dentine of the same teeth test the hypothesis that dental micro-defects are associated with weaning onto a diet that emphasizes nutritionally poor maize.

Garraty, Christopher (Logan Simpson), Travis Cureton (Logan Simpson), Erik Steinbach (Logan Simpson) and Paula Scott (Logan Simpson)

[105] *Relocating the Platform Mound at La Plaza: Recent Archaeological Investigations on Arizona State University's Tempe Campus*

Recent archaeological and historical investigations at the Hohokam site of La Plaza revealed robust evidence that a Classic period platform mound once stood in the north part of Arizona State University's Tempe campus. Maps from the late 1800s and early 1900s documented three Hohokam platform mounds within La Plaza. However, these mounds were leveled by the early to mid-1900s, and archaeologists today can only approximate their locations based on old maps of dubious accuracy. An earlier archaeological investigation showed tentative evidence for a platform mound in the north-campus location, and our more recent investigation corroborates and refines that finding. In this paper, we present multiple lines of evidence for the platform mound: a comparison of ancillary features from known platform mound contexts; examination of historical photographs; and a reconstruction of the ancient surface grade. Analysis of ancillary features beneath and adjacent to the inferred mound footprint provides new insights concerning the organization of public space in La Plaza and, more broadly, the mobilization of labor for communal construction projects in Hohokam society.

Garraty, Christopher [335] see Watkins, Christopher

Garrett, Ashley [194] see Aranyosi, Floyd

Garrison, Ervan [199] see Cook Hale, Jessica

Garrison, Thomas (University of Southern California)

[131] *Hilltops and Boundaries: The Lidar Survey of El Zotz and Tikal*

The ancient Maya kingdoms of El Zotz and Tikal, while not comparable in size or influence, share a geographical region in the central Petén of Guatemala. Tikal is located at the eastern head of the Buenavista Valley, the northernmost east-west corridor of the Petén Karst Plateau, with El Zotz situated 23 km to the west at the intersection of the valley and a north-south drainage leading to El Mirador and the northern Petén. A steep limestone escarpment and the karstic uplands north of it bind the top of the valley and are replete with settlement. The 2016 Petén lidar survey acquired 175 km² of topographic data over this region, with a 1 km wide strip connecting the two major settlements. This paper examines the reliability of the data for detecting ancient settlement in rolling karstic hills and also examines issues of ancient political boundary detection in the densely settled central Petén. Thoroughly mapped, central Tikal provides a great baseline for assessing the reliability of lidar data in this area of the Petén, while extensive reconnaissance of the El Zotz uplands aids in identifying remotely sensed hilltop settlements. The paper concludes with suggestions for future lidar-aided field methods for settlement survey.

[131] *Chair*

Garrison-Laney, Carrie [228] see Hutchinson, Ian

Garrow, Patrick (Consulting Archeologist)

[109] *Discussant*

Garstki, Kevin (University of Wisconsin-Milwaukee)

[37] *Producing Knowledge through the Production of 3D Digital Artifacts*

It is becoming more common to see 3D digital artifacts used for analysis and interpretation, often as if these digital forms are equivalent to the original. This paper discusses the process of creating a 3D model as an essential but often under considered aspect of the final product that should be taken into consideration in their use in any archaeological analysis and interpretation. Digital artifact models inhabit a strange place among the suite of traditional archaeological data—their visual appearance may seem accurate to the original but they are lacking many features (surface feel, mass, etc.) that compose a physical thing. If new archaeological knowledge is to be gained from our use of these digital artifact models, then the significant human input that is involved in the production of these models should be explicit. As representations, digital artifact models have the potential to expand the way we reconstruct the past through material culture, but we should consider how these digital models are produced with specific technologies, techniques, and human choices that may impact the final data and their use in archaeological research.

Garvie-Lok, Sandra [30] see Kwok, Cynthia

Garzon-Oechsle, Andres (Department of Anthropology, Florida Atlantic University) and Valentina Martínez (Department of Anthropology, Florida Atlantic University)

[220] *Results of Survey and Analysis of Manteño Archaeological Sites with Stone Structures in the Las Tusas River Valley, Rio Blanco, Ecuador*
The Manteño (1500 BP–1532) of coastal Ecuador are known for their long distance maritime trade networks along the Pacific coast of the Americas; they occupied a large territory that was geographically and environmentally diverse. This diversity allowed the Manteños to exploit a multitude of resources from each unique environment resulting in distinct settlement patterns for each region. One of the least known of these occupied environments and the focus of this paper is the cloud forest of the coastal mountain chain of Chongón-Colonche. The cloud forest offers a plethora of resources and a multitude of challenges. A two field season intensive survey of the Las Tusas River valley focused on Manteño archaeological sites with structures resulted on 46 structures across 10 sites. Structures were identified by the remaining stone foundations that are primarily still visible on the surface. The survey was conducted by the Florida Atlantic University Archaeological Fieldschool in Ecuador during the summers of 2015 and 2016. The significant number of structures in a terrain that offers very limited space for occupation suggests that the Manteño did not only occupied the extent of the territory but thrived in this challenging environment.

Gasco, Janine (CSU-Dominguez Hills) and Yahaira Nunez Cortes

[218] *Interaction and Exchange in Late Postclassic Xoconochco*
Xoconochco is located along a well-traveled transportation route that links what is today central and parts of southern Mexico with Central America. The region has had cultural and economic ties with its neighbors to the north and to the south for millennia, a pattern that continued into the Late Postclassic period. In this paper we examine the nature of Xoconochco's involvement in Mesoamerican exchange systems in the Late Postclassic period. We know that Xoconochco's forest resources—particularly cacao—were found as far away as the Valley of Mexico and beyond, that obsidian from Central Mexico and the Guatemalan highlands was used in Xoconochco homes, and that some residents had access to metal goods produced in West Mexico. Here we focus on ceramics and what Neutron Activation Analysis can tell us about where the ceramics found in Late Postclassic Xoconochco communities were produced. Analyses currently underway will bring our sample to almost 200 sourced sherds, and these data, together with the data for obsidian and metal goods and the documentary evidence will allow us to better understand patterns of interaction and exchange in Late Postclassic Xoconochco.

Gaspar, MaDu [84] see Gaspar, Maria

Gaspar, Maria (Museu Nacional), MaDu Gaspar (Museu Nacional, Universidade Federal do Rio de Jan) and Paulo DeBlasis (Universidade de São Paulo)

[84] *New Approaches to Sambaqui Archaeology in Brazil*
Sambaquis (shell mounds) have attracted attention since colonial times due to their monumentality, and to the presence of human burials and stone sculptures. Discussions on their natural or human origin dominated up to the 1960s, when debate shifted to cultural history and diet, and moundbuilders were taken as nomadic bands with shellfish-based subsistence. The 1990s, a time of changing paradigms in sambaqui archaeology, coincides with the coming of Suzy and Paul Fish to Brazil. They helped to open new research perspectives as regards site formation processes and interpreting the sambaquis into their landscape and symbolical context. This paper will highlight some advances related to that.

Gassaway, Linn (USFS Lassen National Forest)

[124] *Protecting Historic Structures during Wildfires*
The increased wildfire activity in Western North America is endangering most if not all historic and prehistoric archaeological sites on American's public lands. This paper looks at how archaeologist can work with fire fighters during these emergencies to protect the most susceptible sites, historic structures and wooden buildings and structures to fire, and how to plan for such event and what steps are needed to best protect these sites during a fire event.

Gates St-Pierre, Christian (Université de Montréal)

[178] *Needles and Bodies: A Microwear Analysis of Experimental Bone Tattooing Implements*
Tattoos are embodied experiences, ideas, and meanings expressed by groups and individuals. Many Iroquoian populations of Northeastern North America from the Contact period were known for practicing body transformations of this sort. Moreover, the archaeological literature abounds with cases of Iroquoian bone objects interpreted as tattooing objects. However, such functional interpretations are often proposed without any clear demonstration. In this paper, we present the results of an experimental microwear analysis of replicated bone tattooing implements. We then suggest avenues to further investigate the social dimensions of tattooing practices.

[178] *Chair*

Gates St-Pierre, Christian [85] see McGrath, Krista

Gatto, Maria [229] see Banks, Kimball

Gaudzinski-Windheuser, Sabine [169] see Smith, Geoff M.

Gauthier, Nicolas (Arizona State University) and Matt Peeples (Arizona State University)**[368]** *Drought Variability and the Robustness of Agrarian Social Networks*

How robust were agrarian social networks to drought? Social networks can absorb climate shocks by facilitating resource flows to afflicted nodes and population flows away from them. Because this property of social networks depends on their ability to connect regions with negatively correlated rainfall, we expect the interaction between landscape connectivity and drought spatio-temporal covariance structures will select for particular network configurations. To test this hypothesis, we compare diachronic social-network proxies from the U.S. Southwest to an ensemble of paleoclimate model simulations. We first use outputs from the Community Earth System Model Last Millennium Ensemble project to calculate a multi-scalar drought index for the period AD 1150–1450. We then use Empirical Orthogonal Function analysis to decompose these complex space-time fields into maps of the leading modes of drought variability. Finally, we compare these maps to network data produced by the Southwest Social Networks project, testing whether ties between nodes in opposing climate dipoles are stronger than would be expected by chance alone. Mobilizing these two spatially explicit and diachronic archaeological and climatological datasets allows us to quantitatively assess the complex interplay between social and ecological dynamics on large regional scales.

Gauthier, Nicolas [38] see Bergin, Sean

Gauvreau, Alisha (University of Victoria) and Duncan McLaren (Assistant Professor University of Victoria, BC, Ca)**[49]** *Long-Term Culture Landscape Development at (EkTb-9) Triquet Island, British Columbia, Canada*

EkTb-9, a Heiltsuk First Nation village site located on Triquet Island, British Columbia, Canada, has an occupation span of over 11,500 calendar years. Archaeological and paleoenvironmental research indicates that local sea level was relatively stable during that time. EkTb-9 is rich in archaeology strata including a five m deep shell midden and nearby water-logged deposits which contains perishable materials, most notably parts of bent wood and compound fish-hooks and wooden bi-point technology. Preliminary faunal analysis suggests that diversified marine-based subsistence occurred for millennia; although shell is mostly absent from the peat deposits, an abundance of periostracum reveals that shellfish were intensively used over time, and that an early focus on sea mammal hunting later shifted to fishing rockfish and other species between 7000–5000 BP. Two distinct layers of sand revealed in the stratigraphy suggest that the site experienced two extreme high tide and/or tsunami events. This data, coupled with Heiltsuk First Nation's rich oral traditions and system of prerogatives, is used to explore and build on the notion of "persistent places" and to gain a more thorough understanding of land use and occupation of the region from the early Holocene until the present day.

Gauvreau, Alisha [49] see McLaren, Duncan

Gaydarska, Bissierka [20] see Chapman, John

Gayo, Eugenia M. (Center for Climate and Resilience Research (CR)2), Daniela Valenzuela (Departamento de Antropología, Universidad Alberto), Isabel Cartagena (Departamento de Antropología, Universidad de Chile), Calogero M. Santoro (Instituto de Alta Investigación, Universidad de Ta) and Claudio Latorre (Departamento de Ecología, Pontificia Universidad)**[134]** *Where Are the Camels? II: Contributions from the Stable Isotope Ecology to Understand Mobility and Exchange Patterns in the South Central Andes*

There is a growing volume of literature arguing that camelids were a local resource for prehispanic societies that inhabited the coastal and intermediate Andean valleys from Peru. Indeed, existing evidences show uninterrupted herding practices along the Peruvian lowlands (>2,000 masl) at 8°S-16.5°S during the interval 800 BC–AD 1100. Although camelids archaeofaunal remains, textiles and iconographic representations are recurrent in low-elevation sites from the northernmost Chile (17°-19°S), the relationship of these records with the widespread husbandry pattern detected across the neighboring region has not yet been explored. Moreover, the traditional view that camelids in low-elevation archaeological contexts were brought about by social-economic trade networks with the adjacent highlands (>3,500 masl) still persists. Here, I tackle these issues by reconstructing the origin for camelid in-bone charki found in a caravan site (AD 1000) from the Lluta Valley (18°S, 1100 masl). Specifically, by implementing zooarchaeological analyses, stable isotopes characterization of bone-collagen and Bayesian statistical analyses we attempt to delineate a quantitative case study for evaluating life-history traits of low-elevation camelids that could provide insightful means for identifying converge/divergences in mobility patterns along the south central-Andes.

Gayoso, Henry [170] see Uceda, Santiago

Gaytán-Caballero, Adriana, Belem Zúñiga Arellano (Proyecto Templo Mayor, Séptima temporada) and José Luis Villalobos Hiriart (Colección Nacional de Crustáceos, UNAM)**[225]** *Crustaceans as Part of the Mexica Worldview: Case Study of Offering 125 Associated to the Tlaltecuhli Monolith*

Tlaltecuhli monolith was discovered over offering number 125. It was buried in the sixth stage of construction of Tenochtitlan Sacred Precinct during Ahuizotl government (1486–1502). The offering was composed of biotic elements from Panamic and Caribbean provinces. A microcosm is reflected due the offering disposition, vertical levels represented biota and elements of underworld, terrestrial and aerial stage. The inferior level as underworld, recorded aquatic biota. Crustaceans were identified based on eight exoskeleton fragments as, Macrobrachium sp. prawn and Coelocerus spinosus crab. This contribution analyzed the decapod fragments found with 125 offering, and those were compared with organisms of M. americanum from the CNCR (Colección Nacional de Crustáceos, UNAM, Mexico) and C. spinosus from the CNCR and IZ-NMNH (Invertebrate Zoology collection of National Museum of Natural History, USA). The large estimated size of both species exclude them as foodstuff symbolism and support, as other species found on the same offering, its relevance as some morphological particularity in the prawn case or as a scarce know specimen on the crab. This study also contributes to the actual knowledge of the C. spinosus crab increasing the number of records known worldwide to 23 from 21 localities.

Gearty, Erin (Flagstaff Area National Monuments), Laurie Webster (University of Arizona), Benjamin Aaron Bellorado (University of Arizona) and Louie García (Language arts specialist and Piro/Tiwa weaver)**[60]** *Rare Glimpses: Well-Preserved Weaving Tools, Technologies, and Textiles from the North American Southwest*

Perishable materials that provide information about prehistoric weaving traditions rarely survive in archaeological contexts. The arid environment in the U.S. Southwest, however, has allowed many perishable materials to preserve in excellent condition. Numerous objects collected from the U.S. Southwest, and which are spread out in museum collections across the United States, represent a varied range of textiles and also the material correlates of textile production, including wooden spinning and weaving tools, loom parts, and loom anchors, yucca needles, spun yarns, raw fiber, and

pigments. This diverse array of weaving accoutrement provides rare evidence of techniques, materials, and style for prehistoric cloth production in North America from raw materials to a finished product. Furthermore, in many cases, the archaeological sites themselves provide insights about the method and process of prehistoric weaving in the U.S. Southwest, and help to place the objects within the environment in which they were created.

Gebauer, Anne Birgitte (National Museum, Copenhagen)

[252] *A Megalithic Cemetery with a Cult House in Early Neolithic Denmark*

The paper presents a study of a small cluster of three megalithic tombs and a cult house at Tustrup, Jutland, dating from the period of the first farmers in Denmark during the Funnel Beaker period about 3300–3100 BC. The history of this group of monuments is pieced together using the architecture and the building sequence of the monuments combined with events reflected in the pottery depositions. New insights are discussed in relation to the pottery depositions taking place at the tombs as well as the cult house with regard to types of pottery, degree of fragmentation and methods of deposition. Finally based on the Tustrup site, the role of such monument clusters in the early farming communities is addressed.

Gebru Kassa, Tsige [171] see Eshetu, Zewdu

Gehrels, George [237] see Britton, Emma

Gehrke, Hans-Joachim [221] see Schlotzhauer, Udo

Geib, Phil [368] see Ahrens, Kami

Geiger, Elspeth (University of Michigan)

[341] *Reconstructing Seasonal Subsistence Patterns: A Case Study in Michigan's Saginaw Valley*

The Saginaw Valley provides one of the most robust records of Michigan's prehistoric subsistence history. Of this 10,000-year history, the Middle Woodland to Late Woodland regional transformation has been a particular point of interest concerning local subsistence practices. Previous research has hypothesized a three-zone seasonal subsistence strategy as an essential element of the Saginaw Valley Late Woodland adaptive shift. In particular, this regime included a reliance on riverine and wetlands resources. This poster focuses on the interpretation of archaeobotanical macroremains from Midland Michigan site 20MD263 in the context of this regional pattern.

Geller, Pamela (University of Miami)

[31] *Discussant*

Gentil, Bianca L. (Pennsylvania State University)

[9] *What Does "Collapse" Look Like for Hinterland Sites: Site Distribution and Settlement Pattern in the Valley of Puebla Tlaxcala during the Classic-Postclassic Transition*

This study aims to identify patterns of resilience by distinguishing diachronic socioeconomic processes through the measurement of change and continuity of multilevel sites in the Puebla-Tlaxcala valley. This will be done via demographic, political, and economic markers during the Classic-Postclassic transition. This project focuses on identifying specific processes that lead toward socioeconomic resilience during times of stress. Based upon surveys conducted in the 1960s and 1970s, presented here are the preliminary results of intensive survey of several secondary sites in the Puebla-Tlaxcala valley during the Classic-Postclassic transition and the methodology for systematic key site survey in a broad region. This poster not only displays the preliminary results of the collection, but also the beneficial tools and challenges facing survey archaeology in the past and the twenty-first century.

Gentil, Bianca L. [215] see López Corral, Aurelio

Gentil, Verna (Georgia State University), Elijah J. Hermitt (Pennsylvania State University), Jeffery B. Glover (Georgia State University) and Dominique Rissolo (University of California, San Diego)

[243] *Recent Investigations at the Ancient Maya Port Site of Conil, Quintana Roo, Mexico*

The site of Conil is located in the modern community of Chiquilá on the north coast of Quintana Roo, Mexico. In 1528 Francisco de Montejo, a Spanish conquistador, reported that Conil was a large town consisting of 5,000 houses. Conil was abandoned in the middle of the seventeenth century and was not reoccupied again until the nineteenth century, when it was named Chiquilá. William Sanders was the first archaeologist to work at the site in 1954, but the site core was not mapped until 2005 by Glover. Further work around the monumental site core was conducted in 2014 as part of the Proyecto Costa Escondida, directed by Glover and Rissolo. Based on this work, Conil appears to have one of the largest coastal sites along the north coast of the Yucatán during the Late and Terminal Preclassic and again during the Late Postclassic. This paper presents the results of the 2016 field season at Conil. Survey efforts extended beyond the site core in order to document the spatial extent of the site. By using a combination of advanced geospatial technologies alongside terrestrial survey methods, this recent work has extended the boundaries of the site to c. 5 km in diameter.

George, Nicole [140] see Reaux, Derek

George, Richard (Pennsylvania State University), Claire Ebert (Pennsylvania State University), Brendan Culleton (Pennsylvania State University), Marilyn Masson (University at Albany-SUNY) and Douglas J. Kennett (Pennsylvania State University)

[284] *Stable Isotope Analysis of Animal Diets at the Postclassic Regional Capital of Mayapán*

Subsistence economies during the Postclassic Period (ca. AD 1000–1524) in the northern Maya lowlands were shaped by a range of strategies that included agriculture, the cultivation of wild plants, hunting, trade and market exchange, and the management of animals. Stable isotope data from archaeological faunal remains offer important dietary information to reconstruct the subsistence strategies during this period. In this paper, we present paleodietary data from faunal remains recovered from domestic contexts at the Late Postclassic Maya center of Mayapán. Stable carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) isotope analyses of bone collagen are used to identify the diets of wild herbivores and managed animals. The isotopic data indicate two

distinct groups consistent with the consumption of wild tropical plants and diets high in maize. The heterogeneity of wild species at Mayapán suggests the hunting of wild game composed an essential component of the coastal-inland economic system. The results also indicate that the dogs and some turkeys had distinctive isotopic signatures indicative of animal management by humans. Based on comparisons with a large sample of isotope measurements on humans from the site, we distinguish managed animals with isotopic values within the range of human diets.

Geovannini Acuña, Helga [337] see Dunning, Nicholas

Gerard-Little, Peregrine (Cornell University)

[265] *"The horrors of a wilderness with the beauties of a fertile nature are blended in our prospects at this place": Seneca Ecologies and Colonial Military Expeditions in Seventeenth- and Eighteenth-Century New York*

The shifting settlement pattern of Haudenosaunee groups in what is today central New York state was intertwined with the political order on which the League of the Haudenosaunee was based. These entangled political and ecological practices produced a landscape of significant places and a unique ecology, which impressed European missionaries, travelers, and soldiers exploring this frontier. In the seventeenth and eighteenth centuries French and later American frontier military efforts were directed toward the destruction of not only Haudenosaunee settlements but also food and seed stores and standing crops—the means by which communities' survived in and maintained this ecology. This paper focuses on the archaeologically and historically examined responses of Seneca communities, the westernmost member of the confederacy, to the Denonville campaign of 1687 and the Sullivan-Clinton expedition of 1779 and the ways in which physical and ideological appropriation of Seneca landscapes and ecologies was critical to colonial settlement and domination.

Germonpré, Mietje (Royal Belgian Institute of Natural Sciences), Martina Láznicková-Galetová (University of West Bohemia, Pilsen, the Czech Repu), Mikhail Sablin (Zoological Institute RAS, Saint-Petersburg, Russia) and Hervé Bocherens (Tübingen University; Senckenberg Center for Human)

[127] *The Upper Paleolithic Beginnings of the Domestication of the Dog*

With this contribution, we would like to present our ideas concerning the first steps in the domestication process of the dog. Two main hypotheses on the origin of the dog have been proposed: 1) "Self-domestication" by wolves: Some wolves were following Paleolithic hunter-gatherers to scavenge on the remains of prey left by the prehistoric people at the human settlements. Generation after generation, these wandering wolves adapted themselves to the human dominated environment; and 2) "Social domestication" by prehistoric people: The Upper Paleolithic hunter-gatherers had a cultural tradition that regarded carnivores with a high esteem. Some aspects of such a tradition could have been the keeping of young carnivores for practical reasons (e.g., fur) and for ritual motives (e.g., the keeping of the young as honorable guests or as intermediaries between the hunters' families and the spiritual keepers of the game). The most docile wolves could have been permitted to reproduce. After several generations of unconscious or conscious selection of human-defined behavioral traits, the first dogs emerged. The place that the first domesticated dogs could have occupied in Upper Paleolithic societies can be deduced by artificial modifications of several canid skulls by prehistoric peoples.

We review the pros and cons of each hypothesis.

Germonpré, Mietje [284] see Bocherens, Hervé

Getino Granados, Fernando

[288] *Iconografía de la mariposa en Tula, Hidalgo*

Representaciones de mariposas en la escultórica de la antigua ciudad de Tula, se observan en edificios monumentales y conjuntos habitacionales comunes. Aparece en forma de pectoral de las cariátides que sostenían los techos de los templos principales. Este distintivo también identifica a guerreros sacrificados, representados como altares dentro de espacios ceremoniales. El pectoral lo portan además gobernantes en pilastras y seres mitológicos en lápidas. Atributos de la mariposa se distinguen en representaciones de deidades, como en lápidas con rostros humanos que portan nariguera en forma de mariposa, surgiendo de un ser serpiente-felino-ave. Además hay imágenes de deidades con alas de mariposa: mujer con rostro descarnado y anciano. También hay representaciones realistas de la mariposa en lápidas de conjuntos habitacionales, colocadas en los paramentos de los patios centrales, las cuales se relacionan con los rituales cotidianos de la población tolteca. El simbolismo de la mariposa, está vinculado a la religión y militarismo, cuya imagen está ligada a deidades, seres mitológicos, antiguos gobernantes, guerreros paradigmáticos y guerreros sacrificados. En contraparte, las representaciones realistas encontradas en los conjuntos habitacionales, señalan las características rituales dentro de una concepción religiosa popular.

Geurds, Alexander (University of Oxford)

[158] *Mohammed's Paradise: Indigenous Society and Natural Surroundings in Southern Central America*

Human-environment relations are a point of interest in the archaeology of indigenous southern Central America, defined here to encompass Honduras, Nicaragua, Costa Rica and Panama. As such, it does not seem to deviate from other world regions. This focus in past and contemporary research reflects the weight given to the idea of natural surroundings as resource endowments, following the cultural ecology approach. Elsewhere, such emphases on material, and indeed economic, sides of human interactions with their surroundings were met with criticism in social and human geography and later also in archaeology. This led up to the manifold contributions by what came to be known as landscape archaeology, or the interest in relations between people and place. This paper examines the status of such conceptual rethinking for the regional archaeology of southern Central America. Certainly, the widespread volcanism situated in a unique continental isthmian setting with significant tectonic activity, offers a geography with a particular set of conditions for human societies living there. Alongside regional trajectories of cultural development demonstrating remarkable stability, it seems feasible therefore to develop particular regional notions on the natural surroundings. But which concepts are mobilized in analyses of the archaeological record in this region?

[326] *Discussant*

Geurds, Alexander [179] see Donner, Natalia

Geyer, Brian [18] see Locke, Brandon

Ghoneim, Eman [154] see El-Behaedi, Raghdha

Giammar, Daniel [72] see Lin, Yi-Ling

Gibbons, Kevin (University of Maryland)**[77]** *Icelandic Livestock and Landscapes: Biometrical Signatures of Land Surface Change*

Zooarchaeologists have typically employed faunal biometric data to address questions of domestication, breeding and improvement strategies, animal population demographics, market economies, and the movement of livestock. However, an historical ecology approach to biometrics also suggests the utility of investigating relationships between livestock management strategies and landscape change. Building on over twenty years' worth of standardized zooarchaeological datasets from across the North Atlantic, this paper examines trends in livestock management across the Scandinavian diasporic world from the ninth to eighteenth centuries and engages with geomorphological data to explore the use of animal remains in recognizing abrupt transitions between contrasting land surface states. Iceland, in particular, offers a unique setting to explore the relationship between vegetation cover and livestock morphometrics thanks to existing regional tephrochronological records. Biometrical data offer new insights on the impacts that livestock grazing had on vegetation cover and the resulting nutritional stresses on stock animals as landscapes flickered between alternative stable states as a potential precursor to crossing an erosional threshold. Were livestock managed at the expense of losing natural capital through soil erosion? Understanding these management decisions allows us to engage with larger issues of climate change, environmental conservation, and sustainable resource management systems.

Giblin, Julia (Quinnipiac University)**[196]** *Chair*

Giblin, Julia [196] see Ramireddy, Pranavi

Gibson, Catriona (University of Reading)**[168]** *Raising the Ground, Building a Mound: Bronze Age "Barrowscapes" in Southern Britain*

The prehistoric record of Britain is punctuated by episodes of monumental building, with the Early Neolithic and the Early Bronze Age being particular cases in point. Yet the Neolithic megalithic monuments and long barrows are quite different forms of funerary and ritual architecture compared to the succeeding Bronze Age barrow traditions. The former could be continuously accessed and activated until their final blocking. On the other hand, once a mound was erected over a Bronze Age grave, that burial was effectively covered, closed off and hidden from view. This paper will consider the various factors that led to the emergence and seemingly sudden explosion of "barrowscapes" throughout southern Britain. It will trace their nascent origins in the preceding Beaker period, and explore the socio-ideological and ritual developments bound up with such transformations. I will argue that the motivators behind mound building were not only related to increasing monumentality, visibility and landscape-marking concerns, but that other dynamics were also involved in their creation and subsequent elaboration. These include the changing attitudes to death, mortuary rituals and the potential roles ancestors played. I will draw upon case studies from recent excavations on the classic Wessex chalklands to illustrate this.

Gibson, Wesley [301] see Tsouras, Theodore

Giersz, Milosz**[316]** *Recent Advances on Multidisciplinary Research at Castillo de Huarmey*

The Peruvian site of Castillo de Huarmey located on the desert coast some 300 km north of Lima and 4 km east of the Pacific Ocean, is widely known for the 2012–2013 discovery of the Middle Horizon imperial mausoleum with the first undisturbed Wari high elite women's multiple burial. The tomb, which concealed 64 individuals was accompanied by an abundance of valuable grave goods such as gold and silver jewelry, fine pottery, religious paraphernalia, and textile production materials and tools. Since the discovery an international team of specialist performs research within the framework of the Proyecto de Investigación Arqueológica Castillo de Huarmey (PIACH) using a broad methodological spectrum, including bioarchaeological and biogeochemical analyses, archaeometry, geoarchaeology, 3D HDS scanning and architectural analysis. This multidisciplinary approach ensures high quality of obtained results allowing more precise and accurate interpretations. This makes Castillo de Huarmey invaluable for improving our state of knowledge on the Middle Horizon cultural panorama and the importance of Wari Empire in facilitating intergroup relationships and forging of new identities established and negotiated by imperial elites.

[316] *Chair*

Giersz, Milosz [170] see Pimentel Nita, Roberto

Giese, Thornton (University of Colorado Denver) and Jamie Hodgkins (University of Colorado Denver)**[90]** *More Than One Way to Skin a Goat*

Cutmarks on faunal remains are vital for interpreting the tool use and butchering behavior of ancient peoples. To further explore the inferential possibilities of cutmark analysis, and to determine how easily different butchering behaviors can be identified we conducted a series of preliminary experiments to test the hypothesis that the number, and orientation of cutmarks left on carcasses that were butchered while hanging differ from those left on a carcasses butchered on the ground. Preliminary results indicate that marks on long bones were nearly twice as numerous on bones defleshed on the ground versus those hung up. In addition, cutmarks on long bones from the carcass on the ground were more evenly distributed over the bones than those on the hanging carcass. Although preliminary, the results suggest that the avenues of research into cutmark analysis explored here might prove to be fruitful.

Gifford-Gonzalez, Diane**[1]** *Moderator***Gijanto, Liza (St. Mary's College of Maryland)****[159]** *Interpreting West Ashcom: Drones, Artifacts, and Archives*

Archaeology from St. Mary's College of Maryland began looking for the former homestead of West Ashcom in the spring of 2012. West Ashcom was established on the south bank of the Patuxent River in what is now St. Mary's County, MD, by John Ashcom in 1651. At its height in the early eighteenth century it contained a manor house, kitchen, dairy, orchard, port, haberdashery, and various other barns and dependencies. Using traditional sources such as archives and methods like pedestrian surveys and surface collections, a late seventeenth-/early eighteenth-century site was identified in a

plowed field. Since then, archaeologists from SMCM have employed a range of sources, field methods, and mapping techniques to define the parameters of the site, past structures, and identify activity areas in a largely compromised area. This paper summarizes the results of more traditional uses of GIS mapping paired with experimental drone data to demonstrate the benefit of mixing old and new technologies when interpreting sites subject to continuous plowing and planting.

Gilbert, Steven and Kye Miller

[266] *Early Pueblo Pit Structure Architectural Practice in the Southwest Cibola Region*

Researchers studying architecture in the southwest Cibola region have generally focused on Pueblo II to Pueblo IV aggregated above-ground masonry pueblos. Although these structures provide abundant information about past lifeways, little research has been conducted on pit structure architecture in this region. As such, there is much to be learned from earlier structures dating to the Basketmaker and early Pueblo periods in the southwest Cibola. By characterizing early architectural practice in the southwest Cibola region, as well as architectural practice on the periphery of this culture area, a greater understanding of settlement, mobility patterns, migration, and identity among early Pueblo residents becomes available. Utilizing the communities of practice approach, this paper characterizes architectural practice in the region and discusses how changes in architectural style over time may provide another avenue for understanding past lifeways in the southwest Cibola region.

Gilbert, Steven [266] see Miller, Kye

Gilead, Isaac (Ben-Gurion University of the Negev, Israel)

[338] *Discussant*

Giles, Bretton (CEMML, Colorado State University), Eric Skov (CEMML, Colorado State University) and Shannon Koerner (CEMML, Colorado State University)

[376] *A Comparison of Two Bluff Top Prehistoric Sites at Fort Riley, Kansas*

We compare two sites (14RY3180 and 14RY3184), located on the bluffs above the Kansas River valley on the Fort Riley Military Installation. We examine how these sites were initially interpreted and reassess their significance. This reassessment is based on recent field work at 14RY3184, while our insights about 14RY3180 derive from a reexamination of its lithic assemblage and a new AMS date. We demonstrate through this comparison that 14RY3180 and 14RY3184 were used for different activities, even though they are located nearby one another in similar physiographic settings. For example, 14RY3184 is associated with outcrops of tabular chert that occur along the bluff edge; while the site is a lithic scatter composed of several loci of early stage core reduction. Alternately, 14RY3180 was probably a Smoky Hill camp, given the presence of an assortment of lithic tools, dense lithic debitage, a potsherd, and animal bones. Yet it is also possible that Smoky Hill peoples collected chert from outcrops adjacent to 14RY3180 and that early stage reduction might have occurred there, since the 1990s excavations primarily focused on the central site area. Our comparison illustrates the variability of upland sites at Fort Riley and their research value.

Giles, Bretton [89] see Parish, Ryan

Gill, Kristina [32] see Erlandson, Jon

Gill, Lucy (University of California, Berkeley), Natalia Donner (Leiden University), Irene Torreggiani (Università di Bologna), Antonio Barragán Montero (Universidad Complutense de Madrid) and Alexander Geurds (Leiden University, University of Oxford)

[326] *Interdisciplinary Investigations of the San Gabino Site, Chontales, Nicaragua*

Excavations at the site of San Gabino took place in 2015 under the auspices of Proyecto Arqueológico Centro de Nicaragua (PACEN), directed by Dr. Alexander Geurds. Discovered during a systematic surface survey of the Mayales River sub-basin, north of the town of Juigalpa, the site was selected for stratigraphic excavation due to the chronological significance of its surface finds, in particular colonial-period glazed ware pottery. Colonial wares proved absent elsewhere during the survey, making San Gabino integral to redefining the regional ceramic sequence, from the earliest occupations through to the colonial era. From incipient fieldwork to laboratory analysis, the research process has incorporated ceramic, botanical and zooarchaeological specialists. These collaborations have fostered a synthetic interpretation of this site and others within the survey area, of which San Gabino can be seen as one case study. This paper presents preliminary data on San Gabino, shedding light on the precolonial to early colonial transition in Central Nicaragua and providing an opportunity for reflection on the potential of interdisciplinary research in this area and beyond. Specifically, it examines how the combination of these distinct methodologies can elicit interpretations concerning multifaceted social phenomena, such as consumption practices.

Gillam, Christopher (University of South Carolina), Junzo Uchiyama (Mt. Fuji World Heritage Center), Mark Hudson (Mt. Fuji World Heritage Center) and Carlos Zeballos (Universidad Católica San Pablo)

[371] *Honshu's Preagricultural Landscapes: Perspectives from Mt. Fuji and Toyama Bay*

Preagricultural Japan experienced significant changes in its cultural and natural landscapes over some 30 millennia of human habitation and modification (ca. 34,000 to 2300 calendar years BP). As an extensive period witnessing fundamental environmental and cultural changes, the preagricultural era was dynamic, with sub-periods of relative stability punctuated by episodes of rapid change in lifestyle, material culture, and environmental and cultural setting. This research compares and contrasts the development and change in cultural landscapes of Toyama Bay along the Japan Sea to that of Mt. Fuji near the Pacific Coast. Geographic analyses indicate that early hunter-gatherers clearly targeted ecological edge environments on the landscape that were the most diverse ecotones of the region; particularly the interface of coastal and alluvial plains to adjacent hills of the surrounding mountain ranges. Conversely, late hunter-gatherers shifted their land use to the alluvial and coastal plains. However, early monumental architecture during the Jomon Period suggests that subsistence is only one part of the complex story of these ancient hunter-gatherers.

Gilleland, Sarah (Binghamton University)

[364] *Investigating Late Woodland Aquatic Catchments through the Reconstruction of Freshwater Mussel Habitats in Mississippi and Alabama, USA*

Throughout the Late Woodland of the American Southeast, prehistoric communities appear to have expanded the range of species used for food to include lesser ranked resources, resulting in increased exploitation of freshwater mussel beds. These mussel remains provide a valuable source of information about past environments during the Late Woodland. Because many mussel species are extremely sensitive to the characteristics of the waterways in which they live, the pattern of species distribution and densities potentially enable one to reconstruct past environments. Here, I use assemblages of mussel shell from the Yazoo River Basin, MS, and Tombigbee River Basin, AL to construct hypothetical aquatic catchments that were

used by prehistoric population. Using these catchments, I map the potential prehistoric use of the environment across modern rivers as well as test ethnographic models of space exploitation.

Gillings, Mark [87] see Delefortrie, Samuël

Gillispie, Thomas [252] see Sattler, Robert

Gillreath-Brown, Andrew (Washington State University)

[59] *Looking Outward from the Village: The Effects of Soil Moisture on Prehistoric Cropland in the Central Mesa Verde Region*

Ancestral Pueblo communities of the central Mesa Verde region (CMV) became increasingly reliant on maize agriculture for their subsistence needs by AD 900. Researchers have been studying the Ancestral Pueblo people for over a century using a variety of methods to understand the relationships between climate, agriculture, population, and settlements. While this research has produced a well-developed cultural history of the region, studies at a smaller scale are still needed to understand the relationship between farming landscapes and settlement patterns. Ancestral Pueblo farmers were dependent on having sufficient soil moisture for successful plant growth. A static geospatial soil moisture model was developed to predict potential agricultural field locations in the semiarid region of the Goodman Point watershed in the CMV. The results of the model and its application help to clarify subtle changes within local farming communities. Farmers shifted away from preferred farmland during Terminal Pueblo III (ca. AD 1260–1300), probably because of other factors such as a desire to protect and surround critical water sources. The general outcome of this research is an improved understanding of human-environmental relationships across the local landscape in the CMV.

Gilman, Patricia [84] see Minnis, Paul

Gilmore, Kevin P. (HDR), Derek Hamilton (Scottish Universities Environmental Research Centre) and John W. Ives (University of Alberta)

[339] *Promontory Culture in Eastern Colorado: Franktown Cave and Early Proto-Apachean Migration*

Similarities between contemporaneous occupations from the Promontory Caves in Utah and Franktown Cave in eastern Colorado provide evidence of a pre-AD 1300 migration of proto-Apachean speakers into the Rocky Mountain west using both Intermontane and Plains margin migration routes. Bayesian modeling of Promontory Culture AMS dates from Franktown Cave suggests a 40–85-year occupation starting in the early AD thirteenth century that likely overlaps the modeled 25–55-year occupation of Promontory Cave 1 during the late thirteenth century. Using moccasin size as a proxy for age, the complete Franktown Cave moccasin was likely made for a 4–5-year-old child. Isotopic values ($\delta^{13}\text{C}$) for bison leather from Franktown Cave suggest that bison from northern and southern herds were exploited and products made from their hides were discarded at the site. These data indicate the Promontory Culture group at Franktown Cave was mixed in age, suggesting migrants (rather than scouting groups) that traveled widely or had trade connections both north and south. Increased climate variability during the MCA-LIA transition in the thirteenth century may have contributed to social turmoil and decreasing human population in eastern Colorado, allowing early proto-Apacheans opportunity to move through the area as bison range expanded to the south.

Gilmore, Kevin P. [339] see Larmore, Sean P.

Gilstrap, William (University of Missouri, Columbia) and Wugan Luo (University of Chinese Academy of Sciences)

[33] *Regional Practice in Poly-Chrome Painting Technology in Late Neolithic China*

The Yangshao phase of the Chinese Neolithic is defined by the sudden occurrence of high quality poly-chrome painted pottery in the lower Yellow River basin. In this region there is no precedence for such high quality painted pottery, suggesting it had been imported from further afield. Production origins were previously investigated through examinations of chemical composition by NAA. While this study does not demonstrate the potential origins of this pottery technology, it provided new insight into regional patterns of production, exchange and consumption. Further still, it defined compositional signatures for at least three places of Neolithic pottery production within the study region. Through an integrated framework of microanalysis combining LA-ICP-MS and SEM-EDS, this paper takes the project a step further by reconstructing painting technologies and firing practices of the newly identified production groups. Upon comparison of these final stages of pottery production it becomes evident that specific technological practices, including the use of manganese and iron oxide-base minerals as the foundation of black and red paints, are widespread. However, there are noticeable intraregional differences in the production of white paint. These results suggest that discrete potting communities employed different technologies to achieve a common goal of poly-chrome pottery production.

Gilstrap, William [9] see Callaghan, Michael

Gingerich, Joseph A. M. (Ohio University)

[262] *Refitting Paleoindian Workspaces and Activity Areas*

Shawnee-Minisink represents one of the most spatially intact Clovis assemblages ever found. Recent work focusing on artifact spatial distributions and lithic refitting allow me to better define activity areas within the site. While previous analyses suggest that hide scraping was a common activity at the site it is unclear how such work areas were arranged compared to other features or work areas. This poster presents preliminary refitting results from a Clovis living floor, which suggest the presence of discrete work areas. These data may provide insights into the structure of other Paleoindian campsites, including the predictable distribution of specific artifact types and tool maintenance debris.

[262] *Chair*

Gingerich, Joseph A. M. [262] see Beggen, Ian

Giomi, Evan (University of Arizona), Leslie Aragon (University of Arizona), Benjamin Aaron Bellorado (University of Arizona), Barbara Mills (University of Arizona) and Matt Peeples (Arizona State University)

[390] *Dogoszhi-Style Ceramics as Markers of Elite Status within the Chacoan Regional System*

Dogoszhi-style ceramics are prevalent throughout the Ancestral Puebloan world during the eleventh-thirteenth centuries, and have been suggested as a marker of elite status within the Chacoan World. The replication of the style across different wares and media, occurrence on special forms, and in some

cases highly skilled painting, suggests a shared social significance at the regional scale. We investigate this proposition by examining the distribution of the style across the Chacoan World using the Southwest Social Networks database. Included are ceramic and architectural data on Chacoan Great Houses, great kivas, and other monumental architecture dating from AD 800 to 1200, as well as small house data from several Chaco outliers. Using 50-year periods we investigate (1) the timing and occurrence of Dogoszhi-style at some 300 sites with Chacoan monumental architecture, comparing Chaco Canyon, the "Chaco Halo," and further outliers; (2) the distribution of Dogoszhi-style ceramics within Chacoan communities comparing great houses to surrounding small houses, in terms of both network centrality and Dogoszhi-style occurrence. These analyses define the transformation of Dogoszhi-style from highly localized to a wide-spread, and help evaluate whether it was a marker of elite status associated with the Chaco World.

Giovas, Christina M. (University of Queensland)

[340] *Using Multi-Proxy Evidence to Evaluate Captive Animal Management in the Prehistoric Caribbean*

For some time archaeologists have speculated that non-native mammals introduced to the prehistoric Caribbean may have been managed in captivity, but direct evidence for this practice has been wanting. The question of management is complicated by ambiguous and conflicting data from ethnohistory, animal behavior, and archaeology, as well as potentially unwarranted assumptions about human interaction with synanthropic animals. I examine this issue for introduced agouti (*Dasyprocta* sp.) and opossum (*Didelphis marsupialis*) in the precolumbian Lesser Antilles, using multi-proxy evidence to evaluate their potential captive management. Data from dental eruption sequences, rates of epiphyseal fusion, and stable C, N, Pb and Sr isotopes are employed to examine the cultural role of agouti and opossum and potential management strategies employed by Amerindians. These data provide baselines for addressing the impact of introduced agouti and opossum on fragile island environments and potential incipient domestication in the precolumbian era.

[340] *Chair*

Giovas, Christina M. [156] see Krigbaum, John

Gísladóttir, Guðrun Alda [190] see Woollett, James

Gisler, Jess [301] see Kulisheck, Jeremy

Gjyshja, Zhaneta

[90] *Petrographic and Chemical Analysis of Grinding Stones Collected in Shkodra, Albania*

The Shkodra Archaeological Project (PASH) took place in the Shkodra region of northern Albania. Shkodra presents a wide variety of ecosystems and landscapes, which interact with each other, leading to variation in human settlement, social behaviors, and land use, from prehistory to modern times. During the project, fifty-nine grinding stones were collected from various sites. Preliminary analysis shows that they vary in size and type, are composed of different materials, and belong to different periods, from prehistory to Medieval times. My study incorporates petrography, chemical analysis, and residual analysis in order to determine the source of the grinding stones and how they were used. These data will help us to reconstruct trade, economic and social interactions, and, tentatively, diet, through time.

Glascok, Michael D. (University of Missouri)

[231] *A Geochemical Database for Indigenous Ceramics from South America*

The indigenous peoples of South America have been producing pottery for more than 7,500 years. Pottery was made into vessels for the cooking and storage of foods, funerary urns, toys, sculptures, and a wide range of art forms. Due to the regional differences in the composition of raw materials used to manufacture and decorate pottery, geochemical investigations of pottery have proven successful for studying trade and exchange, changes in technology, provenance, etc. Some of the methods used to analyze pottery are neutron activation analysis, X-ray fluorescence, and inductively coupled plasma-mass spectrometry. All of these are capable of producing large quantities of data. Until recently, access to the geochemical data for pottery from South America has been lacking. A symposium describing several investigations of pottery from South America was held during the 2016 SAA meetings. Presentations from that symposium are now available in a publication from the University of New Mexico press entitled *Geochemical Studies of Indigenous Ceramics from South America* edited by M. D. Glascok, H. Neff, and K. J. Vaughn. The geochemical and descriptive database associated with that volume are publically available from the following website: <http://archaeometry.missouri.edu/datasets/index.html>.

Glascok, Michael D. [10] see Venter, Marcie

Glassburn, Crystal C. [257] see Baxter-McIntosh, Jill

Glassow, Michael [300] see Perry, Jennifer

Gleason, Kathryn (Cornell University)

[27] *The Lost Dimension: Pruned Plants in Roman Gardens*

This paper focuses on previously unnoticed evidence for the pruning and dwarfing of plants represented in Roman garden paintings, such as the well-known example from the Villa of Livia at Prima Porta. Dozens of other examples of detailed garden scenes are preserved at Pompeii and Herculaneum. Their trompe l'oeil effects created interior garden settings for both living and dining spaces, as well as to extend the perceived extent of actual gardens in exterior courtyards of shops, houses, and villas. In the finer examples of this type, the artist has carefully portrayed pruning marks and other horticultural practices that altered the size and natural habit of the plants portrayed. This evidence complements archaeobotanical findings by showing the above-ground appearance of garden plants attested in the archaeological record. The remains of a garden that may be linked to garden paintings were found in 2007 in the Great Peristyle at the Villa Arianna at Stabiae, near Pompeii. The author combines archaeobotanical evidence with analysis of Pompeian garden paintings and texts, to create a reconstruction of the garden that shows how the painted gardens were experienced in three dimensions.

Glørstad, Zanette (Museum of Cultural History/University of Oslo)

[379] *Garnets for the Vikings: Charismatic Jewelry and Family Memories in early Viking Age Scandinavia*

The paper presents how continental-inspired elite jewelry from the Merovingian period (AD 550–800) continued to play an important role in the Viking Age Scandinavia (AD 800–1050). The so-called disc-on-bow brooch were covered with garnets, and is one of the most spectacular jewelry types we know from this period in Europe. They nevertheless appear in a number of female graves from the Viking Age, revealing traces of having been used a

long time, most likely passed down through several generations before they were placed in a grave. This opens up for exploring how tradition and memories were perceived and conveyed in a society where written text was hardly present, and disseminated and preserved through material culture. By seeing the brooches in such a context, it contributes to shed light on the fundamental changes in social structure and mentality that occur during the transition to the Viking Age. The paper will discuss the necessity to take into account how Scandinavian society in the Viking Age was influenced by its own past, and how this historicity, expressed through the brooches, contributed to shape self-recognition and social strategies within various Norse groups.

Glover, Jeffrey B. (Georgia State University), Brennan Collins (Georgia State University), Robin Wharton (Georgia State University) and Marni Davis (Georgia State University)

[18] *Teaching Atlanta: Using Local Projects to Bring Digital Heritage into the Classroom*

How do English, History, and Archaeology professors begin collaborating? In our case it was our mutual interests in the history of Atlanta and incorporating digital methods into our courses. In this paper we discuss our intertwined collaborations at Georgia State University. These involve Wharton's incorporation of archaeological materials from the MARTA archaeological collection in her Expository Writing course. Students in this course take advantage of the computing resources in the library's Collaborative University Research and Visualization Environment (CURVE) and prepare 3D digital models and material culture studies analysis of objects from the MARTA collection. Similar projects using the MARTA collection are occurring in more traditional archaeology classes as well. Eventually, the models, object descriptions, and historical analyses created by students will be integrated into the 3D Atlanta Project, an effort to create a digital, three-dimensional, interactive view of a city block in the heart of GSU's downtown Atlanta campus as it looked in the 1920s-1930s. Paralleling these student-focused efforts is an effort to build pedagogical infrastructure for local instructors. In general, we have found that local projects are an easier way for faculty to get students involved in hands-on research, and the local lens inspires students' excitement and curiosity.

Glover, Jeffrey B. [44] see Tucker, Carrie

Glover, Lauren

[271] *Carnelian Beads in Korea and Japan (c. 100–700 CE): Style, Technology, and Trade Patterns*

This regional study of carnelian beads in Korea and Japan (c. 100–700 CE) provides new perspectives on patterns of regional and long-distance trade and exchange. Possible source areas for carnelian will be presented along with the major stylistic and technological features recorded from carnelian beads. Preliminary analyses confirm the existence of intraregional exchange between polities on the Korean peninsula and the Japanese archipelago proposed by earlier scholars. Long distance exchange with South Asia and possibly Southeast Asia is indicated on the basis of bead shapes and manufacturing technology. Many of the carnelian beads appear to have been drilled using diamond drilling technology that has its origins in South Asia. Additional drilling technology using stone drills or abrasives with metal drills may indicate local production or trade with regions in what is now China. Quantitative analysis of drill hole size and overall size and shape of the beads points to multiple workshops supplying the imported beads and additional workshops producing the regional or local forms. The distribution patterns of the beads in different polities may reflect changes in trade networks over time as well as stylistic choices of bead shapes used as a means of differentiating specific groups or individuals.

Glowacki, Donna (University of Notre Dame)

[278] *(Trans)Formation, Centralization, and the Making of a Mesa Verde Village*

Our understandings of how socio-complexity developed and the role households played in those developments are often hampered because we lack adequately fine-grained chronological data to identify when and how the relationships among households change. A detailed analysis of architecture and 260 tree-ring dates at Spruce Tree House cliff dwelling has produced a new reconstruction of how the village grew and changed over time at a decade-by-decade level. The village was occupied during the 1200s—a time of significant social and religious transformation, violence, climatic hardship, and the exodus of ancestral Pueblo people from the Mesa Verde region. This new information reveals how village life and social organization was fundamentally altered through increasing centralization that created of a locus of social and religious power within the village during the 1240s. This transition co-occurs with an apparent shift in power from the families who founded the alcove village to newcomers, who likely had new rituals and stronger influence in the community. Evidence of burning and remodeling in specific rooms suggests this transition was also contentious. Insights gained from this study bear on understanding the evolution of social hierarchy in Pueblo society and its fourteenth-century transformation that de-emphasized rank differences.

Glowacki, Donna [155] see Reese, Kelsey

Gluchy, Maria [45] see Viana, Sibeli

Gnivecki, Perry and Mary Jane Berman (Center for American & World Cultures, Miami University)

[395] *Colonial Encounters in Lucayan Contexts*

There are numerous examples of material and bodily flows (e.g., human transfer, enslavement) between the Lucayans and the Spanish during the period of late fifteenth- and early sixteenth-century colonial encounters. A variety of indigenous and Spanish items circulated, as relationships were established. These are known from ethnohistoric accounts and archaeological evidence from several different islands and sites located in the Bahama archipelago, including San Salvador, Andros, Long Island, Middle Caicos, and others. In this paper we will examine procurement and exchange from the perspective of the givers and receivers and those who recorded these acts. We will examine what objects and bodies were circulated; the intentions of the givers and receivers; the acts of procurement, giving, and receiving; the meaning of the items and bodies in the contexts in which they were procured and distributed; the changing values of the objects and bodies in these contexts, and the relationships that were established as a result of these acts.

Gobbo, Diego [56] see Moralejo, Reinaldo

Goddard, Jennifer

[360] *Cultural Amnesia, Archaeological Vandalism, and Loss Aversion in Heritage*

Loss aversion theories contend that people prefer to avoid losses than acquire gains. Further, this tendency increases with object possession and ownership history. Although loss aversion implies a preference for heritage conservation practices, Holtorf (2015) argued that material losses could provide greater heritage gains. This paper asserts that loss aversion tendencies are relative to the referent's valence perceptions. Positive or negative valence embedded in heritage values will differentially influence the preference to avoid loss or embrace it. Whereas people tend to avoid the loss of

positively construed heritage, negatively construed heritage is often destroyed, forgotten, or omitted. Using examples of cultural amnesia in heritage as well as various types of archaeological vandalism, this paper will demonstrate how negative and positive valence differentially affect loss aversion tendencies and further suggests how this might play a role in heritage management.

Goddard, Tim

[149] *Discussant*

Goddard, Tim [18] see DeMuth, R. Carl

Goder Goldberger, Mae (Ben-Gurion University of the Negev), Talia Abulafia (Ben Gurion University of the Negev), Omry Barzilai (Israel Antiquities Authority), Israel Hershkovitz (Sackler Faculty of Medicine, Tel Aviv University) and Ofer Marder (Ben Gurion University of the Negev)

[338] *The Middle Paleolithic Artifacts from Manot Cave (Western Galilee), Israel*

Manot Cave is situated within the Levantine Mediterranean region. The site has an extensive Upper Paleolithic sequence, including both Aurignacian and Ahmarian traditions. Several of the artifacts found within these assemblages belong to the Levallois technology. A small number of the artifacts, found in association with Upper Paleolithic occupational surfaces, have a double patina, possibly due to reuse. The majority are fresh suggesting the presence of a Middle Paleolithic occupation at the site. This study will present the Levallois Middle Paleolithic artifacts from the cave. The Levallois techno-typological traits indicate resemblance to other mid-late Middle Paleolithic techno-complexes present in the region. One of the Levallois centripetal cores from the collection exhibits a series of line engravings on its cortex-covered face. These incisions are organized radially, in a fan-shaped design, and are thought to reflect a nonutilitarian practice. The incisions were performed prior to the last removals from the flaking surface, and thus cannot be related to reuse of the core at a later period. Two other examples, dating to the Middle Paleolithic, are known from Quneitra and Qafzeh. Both present engravings on cortex-covered surfaces of flint plaques.

Godin, Genevieve

[318] *Inclusive Heritage: Learning from Urban Art in Berlin*

Alternative, subcultural, or otherwise non-mainstream forms of heritage are increasingly being recognized, both in the social imaginary and in the discipline. Such moments provide archaeologists with opportunities for actively working toward a more inclusive and diversified heritage practice. Specifically, my work explores the potential of urban art walking tours and workshops in the borough of Kreuzberg (Berlin, Germany) from a contemporary archaeological standpoint. As tour guides present painted surfaces to an audience, public views of urban place-making and of the right to the city are transformed. As a result of making visible the often-marginalized practice of urban art, its legitimacy is increased and, consequently, the notion of what constitutes cultural heritage is challenged. Employing queer pedagogy, tours and workshops take on an archaeological dimension, as explicit and embodied knowledge is shared horizontally between writers/artists/guides and tour goers. I contend that these small-scale gestures of showing graffiti and street art work toward breaking down the broader barriers between mainstream and alternative, experts and communities, as well as authorized and marginalized ways of being in cityscapes.

Goebel, Ted (Texas A&M University)

[226] *On the Trail of the Stemmed Point: A Circum-Pacific Perspective*

Half a century ago, Alan Bryan proposed that two distinct early Paleoindian traditions occurred in North America—Clovis Fluted east of the Rocky Mountains and Great Basin Stemmed in the far west—and that these co-traditions potentially represented different founding migrations from the Old World, with Great Basin Stemmed potentially being tied to a coastal north Pacific route. Much of the research that Ruth Gruhn and her partner Bryan conducted during the next several decades, certainly into the 1980s, was devoted to further exploring this theory, for example their excavations at Smith Creek Cave and Handprint Cave in Nevada and Wilson Butte Cave in Idaho, as well as Gruhn's important essays on the coastal-migration route in 1988 and 1994. Given renewed interest in the co-tradition/co-migration theory today, here we consider the current archaeological and genetic record in light of the following questions: What are the space-time systematics of stemmed points in western North America? Did stemmed points of the Great Basin originate from a Pacific coastal source? How do they relate to the Paleolithic records of Alaska and northeast Asia?

[226] *Chair*

Goebel, Ted [47] see Graf, Kelly

Goepfert, Nicolas (CNRS)

[238] *Herds for Gods? Sacrifice and Camelids Management during the Chimú Period*

Although domestic Andean camelids are native from the highlands they have been largely present in the Peruvian coast since the end of Early Horizon (near 200 BC). This presence stresses the symbolic, ritual importance and economic values of camelids. In 2011 an impressive human and animal sacrificial context dating from the Chimú period was found in Huanchaquito near Chan Chan on the northern coast. At least 130 children and 200 camelids were uncovered during the successive excavations that took place between 2011 and 2016. This is undoubtedly the biggest sacrificial deposit of camelids dating from the prehispanic times found in the Central Andes. This exceptional context raises questions about herd management by Chimú populations. During the Inca period camelids were separated according to their color pattern and some colors especially devoted to the divinities and rituals ceremonies. Was this system created by the Incas or did it have predecessors? We hypothesize that Chimús had similar practices which may have inspired the Incas. In this paper we will use different elements, such as mortality profiles and coat color, to test this assertion and the possible descent link between the two periods.

[238] *Chair*

Goepfert, Nicolas [238] see Dufour, Elise

Góes Neves, Eduardo [327] see Watling, Jennifer

Gogichaishvili, Avto [164] see Maldonado, Blanca

Goldberg, Paul (Boston University)**[110]** *Discussant*

Goldberg, Paul [213] see Patania, Ilaria

Goldberg, Sophie (Trent University)**[214]** *Beyond the Bayon and Ta Phrom: Modeling Demography and Population Health at Angkor, Capital of Medieval Cambodia (802–1431 CE)*

Angkor, the capital of the Khmer empire, is famous for being the largest “dispersed,” or “low-density,” city in antiquity, with an estimated population of 750,000 people. Attracting and maintaining a large support population of agriculturalists to Angkor was paramount for Khmer rulers in order for them to amass the spiritual and physical capital needed to compete against their rivals in this society’s merit-based, temple economy. In the ongoing conversation surrounding Angkor’s domestic archaeology, one emerging topic is identifying population pressures exerted by the monsoon-forest environment; correspondingly, this study seeks to answer what socio-ecological role tropical diseases played in Angkor’s population patterns. By utilizing GIS ecological modeling, this study will assess Angkor’s landscape for a select group of diseases’ likely local origins, reservoirs, vector habitability, and their paths for transmission; and, examine how these above variables would have changed over time and space in relation to the major land-use transformations of Angkor’s urban developmental sequence. Ultimately, the goal is to create a series of disease profiles which illustrate the socio-ecological impact of tropical diseases on Angkor’s population size, density, and health; with these results, general conclusions will also be possible for future demographic modeling of other preindustrial, tropical state societies.

Golden, Charles [118] see Alcover Firpi, Omar A.

Goldfield, Anna (Boston University)**[248]** *The Fat of the Land: An Energetics Approach to Paleolithic Bone Fat Exploitation*

I present an energetics approach to Neanderthal and anatomically modern human (AMH) exploitation of prey carcasses for bone marrow and bone fat, crucial nutritional resources during glacial periods in Paleolithic Europe. Previously established differences in daily caloric budget between the two groups predicate variation in behavioral cost thresholds, or a point at which an individual decides that the cost of processing a food resource outweighs the gain and abandons the task. A higher metabolic baseline cost has been established for Neanderthals relative to AMH. For Neanderthals, therefore, the energy available to be allotted to subsistence tasks is expected to be a lower amount than that available to AMH. A lower cost threshold is therefore expected for Neanderthal carcass processing. Thus, in Middle Paleolithic faunal assemblages, we expect to find evidence for less intensive carcass processing than in Upper Paleolithic assemblages. Greater access to lipids in restrictive climatic conditions may have led to increased adaptive fitness and overall survival for AMH, with evolutionary implications. A comparison of skeletal element representation and bone fragmentation from five Paleolithic faunal assemblages from southwest France tests for differences in intensiveness of bone fat processing in Quina Mousterian, early Aurignacian, and Magdalenian glacial contexts.

Goldstein, Lynne (Michigan State University)**[37]** *Thinking Differently? How Digital Engagement, Teaching, and Research Have Influenced My Archaeological Knowledge*

Having been a professional archaeologist for a very long time, I have used a variety of different tools. Since 1988, I have actively employed digital tools for archaeological research, teaching, and public engagement. This work has primarily been based in the Midwestern United States, and has included both prehistoric and historic sites. In this paper, I highlight three examples and discuss the epistemological implications of the digital tools. The first is a Wisconsin projectile point book prepared almost completely from a digital database I created. The second is a flipped classroom whose focus was a report jointly written by the students in the class, as well as their own separate projects. The final example examines the extensive social media work done as creator and Director of the Michigan State University Campus Archaeology Program. In each example, the work could certainly have been accomplished without digital tools, but the tools significantly changed the way that I and the other participants thought about and conducted the archaeological work. These epistemological shifts in thinking have had significant, and I argue positive, impacts on archaeological research, teaching, and engagement.

[372] *Moderator***Goldstein, David (National Park Service) and Jon Hageman (Northeastern Illinois University)****[388]** *From Quelites to Crop Indices: Thinking Through Maya Chenopods*

While chenopod cultivation has been documented extensively in North and South America, evidence for similar practices in the Maya area is lacking. Macrobotanical evidence of *Chenopodium* recovered from prehispanic Maya archaeological sites is limited to a few seeds. In contrast, the palynological record suggests widespread tolerance across the entirety of the Maya area, if not intensive management or even cultivation of *Cheno-am* genera in some contexts. It is likely that chenopods are an integral part in the successional agroecology of fallowing and milpa agriculture. Typically, archaeologists consider such data as evidence of food production, but our work in documenting the ubiquity and uses of plant among ethnographic Maya populations strongly suggests that the primary use of chenopods among the Maya is as a source of greens and medicine.

Goldstein, Paul (UC San Diego)**[202]** *Tiwanaku Colonization and the Great Reach West: Preliminary Results of the Locumba Archaeological Survey 2015–2016*

Locumba represents a key intermediate location for consideration of the timing and affiliation of Tiwanaku colonization of the Moquegua, Sama, Caplina and Azapa valleys. Models of Tiwanaku state colonization, diasporic enclaves, and a “daisy chain” of secondary and tertiary colonization from initial provinces in Moquegua are considered. Ongoing systematic regional survey in the 2015 and 2016 seasons of the Locumba Archaeological Project has defined 74 site sectors, including 16 sectors of Tiwanaku affiliation, in the Cinto and Salado tributaries (600–1000 masl). 2016 fieldwork delineated the three Tiwanaku residential sectors of the multicomponent site of Cerro San Antonio (L1 with systematic surface collection and test excavations. Excavations suggests a typical Tiwanaku V occupation with functional distinctions between sectors and one small ceremonial structure. Ceramics connect to other Tiwanaku V assemblages of the western valleys, with a majority presence resembling Moquegua’s Chen Chen style, along with local and other Tiwanaku regional variants (Tumilaca, Cabuza). Comparison suggests contemporaneity and a degree of social relationship with the Moquegua colony, leaving open the possibility of the daisy chain model. However, differences in motif distribution also suggest independent social, stylistic and exchange ties to both the altiplano and the Norte Grande.

[170] *Discussant*

Goldstein, Paul [174] see Gaggio, Giacomo

Goldstein, Steven (Washington University in St. Louis), Michael Storozum (Washington University in St. Louis), Fiona Marshall (Washington University in St. Louis), Rachel Reid (Washington University in St. Louis) and Stanley Ambrose (University of Illinois at Urbana-Champaign) [154] *Herder Land Use and Nutrient Hotspots in Southern Kenya: Geochemical Analysis of Anthropogenic Soil Enrichment*

Mobile herding societies are often considered to leave behind few traces in the archaeological record, however pastoral settlements may have helped shape the broader landscape. Herders relying on domesticated cattle, sheep and goat arrived in the most productive grasslands of East Africa >3600 cal BP years ago. Our collaborative research investigates the legacies of their land use through geoarchaeological analyses. We present results of analyses of five Pastoral Neolithic era archaeological sites and offsite controls from southern Kenya dating to between 3300 and 1800 BP. Particle size, loss on ignition, magnetic susceptibility and ICP-MS elemental analyses demonstrate that sediments derive from comparable lithologies. Livestock-dung-derived deposits at these archaeological sites are significantly enriched in Ca, K, Mg, Na, P, Sr, compared to controls. These are important micro-nutrients for plant growth. In some samples, these elements are elevated in archaeological layers by 10–80%, but sometimes 1000%, over background values. This research demonstrates that small scale pastoralist land use over three millennia leaves an enduring imprint on the landscape that is inextricable from the natural history and ecology of East African savannas. This pilot study illustrates the role of mobile herders in promoting ecological resilience and biodiversity in African savannas by creating nutrient “hotspots.”

Golitko, Mark (University of Notre Dame)

[178] *How Social are Archaeological Social Network Analyses?*

Archaeometric studies of archaeological materials by their nature examine social process—for instance learned technological traditions, socially mediated access to raw materials, or the social act of exchange. Models and methods drawn from social network analysis have gained popularity as a means of more formally modeling social relationships, and hold promise as a missing link between laboratory data and the social dynamics archaeologists wish to understand. However, archaeological applications to date have in many cases lacked detailed discussion of the underlying social processes and behaviors that produce the archaeological record, or rely on network principles conceived at the level of the individual and apply them to aggregate social behavior. Here, I discuss some of the potentials and shortcomings of network analysis in archaeology as practiced to date, and suggest that archaeologists need to become more involved in the production of underlying social network theory if such methods are to achieve lasting relevance to studying the past.

Golitko, Mark [196] see Jensen, Craig

Golubiewski-Davis, Kristina (Middlebury College)

[189] *Reconstructing Social Networks: Using 3D Scans to Infer Networks of Shared Manufacture Knowledge in Late Bronze Age Central Europe*

This project is a case study using 3D scans of Late Bronze Age swords (~1200–800 BC) to re-create community networks of knowledge. Measurements from 111 3D scans of bronze sword hilts were taken based on characteristics related to manufacture and style, including cross sections. Fourier analysis was used to represent the curvature of cross sections numerically. The measurements taken and the results of the Fourier analyses were then processed using principal component analysis to combine related shape data. From there, several cluster analyses on the different types of data were used to group blades by morphological similarities. These cluster analyses formed the basis of links in a network graph. While nodes were defined in various ways, treating individual swords as nodes provided the most interesting results. Finally, a community detection algorithm was run on the networks to examine potential communities of bronze smiths, as represented by the swords. In this paper, I will present the general workflow and statistical methods used alongside my conclusions discussing the networks I detected and how those affect our understanding of LBA bronze smith communities.

Goman, Michelle (Sonoma State University), Arthur Joyce (University Colorado, Boulder) and Jessica Hedgepeth Balkin (University Colorado, Boulder)

[82] *Formative to Postclassic Land-Use Changes in the Lower Río Verde Valley, Oaxaca*

We provide a summary of the past ~15 years of paleoecological and paleoenvironmental analysis in the Lower Río Verde Valley. Ten lacustrine, wetland and estuarine sites throughout the valley and coastal zone were selected for sediment coring. The sediments were intensively sampled for a suite of biological and sedimentary analyses chosen to provide insight into changes in local and regional land use. Our findings indicate initial land clearance and incipient agriculture occurred during the Archaic in the coastal zone. Agricultural activity, with the planting of maize, first occurred in the floodplain during the Late Formative. A spatial analysis of agricultural activity at the sites indicates a preference for areas throughout the western floodplain; however, the focus of regional land use changed with regional political developments. The southern and southwestern sections of the valley were avoided during the Early Classic when archaeological evidence suggests the decline of the Río Viejo polity and a demographic shift into the more western Piedmont. Ongoing analysis of two floodplain lakes indicate significant dry conditions occurred at the end of the Classic and through the Postclassic with archaeological data indicating the collapse of the Río Viejo polity and a shift of settlement into the piedmont.

Goman, Michelle [306] see Morales, Alejandro

Gomberg, Emmalea [71] see Meissner, Nathan

Gómez, Anna [23] see Molist, Miquel

Gomez-Gastelum, Luis (Universidad de Guadalajara), Victor Landa-Jaime (Universidad de Guadalajara) and Emilio Michel-Morfin (Universidad de Guadalajara)

[236] *Conquiliología en Arqueología, o “Cómo Trabajar Materiales Arqueológicos de Concha Sin Morir en el Intento”*

En el interés de los estudios interdisciplinarios cada una de las partes aporta un conocimiento especializado, lo que tiene como finalidad generar aportes más sólidos en los campos que intervienen. En el caso de la arqueología, el análisis de materiales de concha implica el concurso de especialistas bien entrenados, pues no es lo mismo el estudio de moluscos actuales que el de tiempos pretéritos. Ello obliga a partir de los conocimientos más actualizados tanto en el ámbito de la arqueología como en el de la conquiliología, cosa que al menos en el caso de la arqueología mesoamericana no siempre sucede. Uno de los puntos cruciales para un trabajo exitoso de arqueconquiliología, es la correcta identificación de las especies presentes en los contextos arqueológicos. Por ello en esta ponencia se discuten las formas para identificar conchas arqueológicas, así como

los cambios que ha sufrido la nomenclatura en los estudios malacológicos actuales. Para ejemplificar se utilizarán materiales procedentes de contextos arqueológicos en el occidente de México.

Gómez-Puche, Magdalena [165] see Fernandez-Lopez de Pablo, Javier

Goncalves, Celia (ICArEB—Universidade do Algarve), João Cascalheira (ICArEB—Universidade do Algarve), Jonathan Haws (University of Louisville), Mussa Raja (Universidade Eduardo Mondlane) and Nuno Bicho (ICArEB—Universidade do Algarve)

[154] *Using GIS and Archaeological Survey Data for the Reconstruction of Stone Age Settlement Patterns in the Elephant River Valley, Mozambique*

The central topic of this poster focus on the conversion of archaeological survey data to a GIS format for the identification of settlement patterns by communities that inhabited the Elephant River region, a tributary of the Limpopo River (southern Mozambique), from c. 300,000 to c. 20,000 years ago. Specifically, we tried to identify and characterize the settlement dynamics of each cultural phase (MSA and LSA), in order to understand the choices related to the selection of site location in connection to natural/landscape-related factors, visual prominence in the landscape, among others. Using data collected during archaeological field survey conducted in the Elephants river valley in 2015 and 2016 and GIS techniques we explore a series of simple but important issues in relation to visibility and patterning of archaeological data. The GIS analysis were conducted using ESRI's ArcGIS 10.3 software leveraging a variety of standard geoprocessing tools and custom geoprocessing models

Goncalves, Celia [154] see Cascalheira, João

Gonciar, Andre [294] see Lucas, Virginia

Gong, Wei [78] see Chen, Xuexiang

Gonlin, Nan (Bellevue College)

[80] *Luminosity in the Ancient Maya World*

It is only through light that darkness is visible. The anthropology of luminosity as put forth by Bille and Sørensen (2007) regards light as something to be manipulated, matter which is used in cultural practices. In what ways did the ancient Maya light up the night and illuminate dark places? Evidence for ancient lighting is contained in artifacts and features, epigraphy, iconography, language, ethnohistory, and history, as well as the ethnographic record. Some of the major topics that we will address are how ancient cities were lit at night, variation in lighting from city to countryside, status differences in illumination, and the role of bioluminescent insects in adding glow to the dark. We question whether the modern desire for abundant night lighting is a cultural universal; humans perform without the brightness of day as other senses come to dominate the nightscape. In many circumstances, however, lower lighting is preferable for the performance of a variety of activities that were best conducted under the cover of dark. Apart from the material evidence for lighting, the metaphorical place of light and dark in the Classic Maya worldview will be examined.

[80] *Discussant*

[80] *Chair*

Gonlin, Nan [80] see Reed, David

Gonzales, Cristina [11] see Hankins, Sharon

Gonzalez, Lissandra (Instituto Nacional de Antropología e Historia—Centro Regional Michoacán), José Luis Punzo (INAH-Michoacán), Mijaely Castañón (INAH-Michoacán) and Alejandro Valdes (INAH-Michoacán)

[12] *Ritualism and Metal Objects in Michoacán*

The area of the current state of Michoacán has been considered one of the most important producers of metal objects during the Prehispanic period. These objects are always related to various rituals because of its peculiar characteristics of color, sound, shape and even smell. From the analysis of more than 1,800 metal objects from extensive collections, particularly at the Regional Museum of Michoacán and the State Museum of Michoacán, by the Project Archaeology and Landscape of the Center—South Area of Michoacán, we could deepen into various and important rituals in which the characteristics of the metal objects played fundamental roles in the interagency relationships between practitioners and ritual specialists, and the phenomenon of metal objects as another factor which interact as minimum unit of symbolism underlying the Tarascan world view. In that sense, we investigate the agential abilities of metal objects in the Tarascan world through archaeological contexts, but especially through the study of historical sources.

Gonzalez, Lissandra [12] see Castañón, Mijaely

Gonzalez, Lissandra [12] see Valdes, Alejandro

Gonzalez, Ramon [151] see Tarquinio, Daniella

Gonzalez, Sara L. (University of Washington, Seattle)

[108] *Moderator*

Gonzalez, Toni (University of California, Santa Barbara) and Samantha Lorenz (California State University, Los Angeles)

[386] *Architecting the Underworld: What Is a Southern Maya Lowland Chultun?*

Chultunes, man-made subterranean chambers excavated into limestone bedrock, are ubiquitous features encountered throughout the Maya cultural region. Although studies in the Northern Lowlands have demonstrated that chultunes in that locale functioned as water cisterns, the ascription of them as purely utilitarian within the Southern Lowlands is under much debate. One issue that hinders dialogue is lack of a commonly accepted understanding of what constitutes a chultun. The first aim of this paper is therefore to elaborate on specific characteristics that can be used to identify these subterranean features. The second is to couple a ritual landscape approach with the theoretical paradigm utilized by cave archaeologists to begin to frame questions about what the morphology and spatial distribution of chultunes within and between sites can tell us about their importance to and utilization by the ancient Maya.

González Álvarez, David (Institute of Heritage Studies, Incipit, CSIC (Spain)/Durham University [UK]) and Tom Moore (Durham University [UK])
[324] *Societies against the Chief? Reassessing the Value of "Heterarchy" as a Concept for Describing European Iron Age Societies*

As a reaction against the dominant warrior chiefdom model of European Iron Age society, much of recent scholarship has emphasized the negotiated nature of power in these societies. Such approaches frequently characterize these societies as 'heterarchical' yet the dynamics of how communities operated above the level of the household remain relatively under-theorized. This paper reassesses the value of concepts of heterarchy for two regions of Europe, southern Britain and North-western Iberia. It will explore the extent to which the social organization of these regions share any similarities which makes this overarching term useful and, through exploration of the work of the likes of Pierre Clastres, discuss the underpinning mechanisms which might explain these heterarchical social forms. A better understanding of the social dynamics of these communities will also allow for a more nuanced assessment of the apparent emergence of more centralized, hierarchical societies at the end of the Iron Age. Was this really the emergence of proto-states as so often argued? Or does the apparently fluid nature of Kingship in the Late Iron Age suggest these power structures were more heterarchical than we imagine and owe a greater debt to the social systems of earlier centuries than is normally suggested?

Gonzalez Carretero, Lara (University College London) and Dorian Q. Fuller (University College London)

[21] *9,000-Year-Old Cereal Meals: New Methods for the Analysis of Charred Food Remains from Çatalhöyük East (Turkey)*

Remains of archaeological cereal preparations are often recovered from archaeological Neolithic sites across the Near East and Europe through flotation. These are recognizable as seemingly amorphous charred fragments of plant material. The study of these charred fragments of ancient meals is of considerable importance because the identification of their components allows the characterization of the nature of the food types represented, and their preparation, provides insights into past culinary traditions. Within this paper a new methodology for the investigation of these charred fragments of cereal preparations is presented, which utilizes Scanning Electronic Microscopy (SEM) analyses of microstructures present within them by which the processes leading to their formation can be scrutinized. We will concentrate on three aspects; (1) the composition of these charred fragments; (2) the characterization and classification of their microstructure according to possible methods of processing, preparation and cooking; (3) their comparison with experimentally prepared charred reference material. These techniques were applied to material recovered from Neolithic Çatalhöyük (Turkey), and the first results are presented here.

Gonzalez Lauck, Rebecca B.

[267] *The Archaeological Collections of the Gulf Coast Cultures at the National Museum of Anthropology*

The National Museum of Anthropology in Mexico City holds the largest collection of archaeological artifacts in the country. A recent survey and inventory of the objects that form the Gulf Coast cultures section has revealed a more comprehensive and detailed view of the composition of it. This paper will present an overview of this collection providing information on the site provenience of the artifacts; what private collections were incorporated into it; the types of artifacts, as well as their chronology, among other kinds of data. I will also talk about the challenges of the individual documentation of the objects and of making this information available to the wider public.

Gonzalez Lauck, Rebecca B. [3] see Dobereiner, Jeffrey

González López, Angel (UC Riverside) and Andrew D. Turner (Yale University)

[119] *The Personification of Sacrificial Fire: An Undescribed Deity in Imperial Mexica Sculpture*

A recurring theme in H. B. Nicholson's groundbreaking analysis of Central Mexican deities is the application of a holistic approach to the analysis of Mexica stone sculpture, which includes visual and iconographic analysis, and comparison to early colonial texts. This paper will analyze a poorly understood deity that appears in late Mexica stone sculpture based on Nicholson's innovative methodology. This fanged being appears only in stone sculpture from the imperial capital, and has previously been interpreted as an earth goddess, Tlaltecuhli, or the fire god, Xiuhtecuhtli. We argue that this deity is indeed a being of fire and earth, although not the aforementioned deities. Rather, this deity appears as a personified brazier and as a burning bundle of wood, and was likely associated with cremation, sacrifice, and fire ceremonies.

[119] *Chair*

Gonzalez-Macqueen, Felipe (Western University), Giles Spence-Morrow (University of Toronto), Peter Bikoulis (University of Toronto), Willy Yépez Álvarez (Royal Ontario Museum) and Justin Jennings (Royal Ontario Museum)

[233] *Spatial Analysis of Geoglyphs in the Sihuas Valley, Peru*

Geoglyphs are large features frequently created by removing rocks and surface dirt in order to create a large scale designs. Although often studied in isolation, much can be learned from the position of geoglyphs relative to other features on the landscape. As part of the Quilcapampa Archaeological Project, a reconnaissance survey guided by remotely sensed imagery was performed in order to document and map geoglyph iconography found on the pampa of the Sihuas Valley, Peru. To date, over 100 geoglyphs have been identified. We performed a variety of spatial analyses in order to determine what their location can potentially tell us about their original creation and purpose. In particular, the close proximity of these geoglyphs to ancient trails and roadways on the open pampa speaks to the importance they may have had marking routes and connectivity during the Middle Horizon and Late Intermediate periods.

Gonzalez Omaña, Diana (Diana Gonzalez Omaña)

[328] *San Marcos Jilotzingo: Heritage Issues after 900 Years of Continuous Occupancy*

In September 2015, the second season of The Northern Basin of Mexico Sites Verification Project was made. During fieldwork, we had the chance of visit San Marcos Jilotzingo, a little town in the Mexican state of Mexico, and realize that the current village lay over the remains of prehispanic Jilotzingo, in which they share the same agricultural terraces, the tuff carved streets and building materials. But surprisingly there were no structures, since the current inhabitants of Jilotzingo dismantled prehispanic constructions in order to solve their daily needs, such as: raise the fences of their homes, to dam the river, or building tombs in the local cemetery. The viceregal Jilotzingo, use to bring limestone to Hueyapoxtla, to produce lime to sell to the Spaniards. Later, this area was incorporated into the encomienda given by Cortes to Isabel de Moctezuma. But all this is ignored by the modern inhabitants of

Jilotingo because at some moment of time, they lost the memory of their own history. Perhaps, remembering their past will work to stop the loss of their heritage or, maybe, poverty is their worst enemy.

González Rodríguez, Cristián [346] see Murphy, Beau

González-Ruibal, Alfredo [324] see Criado-Boado, Felipe

Goodale, Nathan (Hamilton College)

[278] *Founding House, Neighborhood, Village: Hunter-Gatherer Social Complexity at the Slocan Narrows Site, Upper Columbia River Area, Interior Pacific Northwest, North America*

The Slocan Narrows site is a prehistoric pithouse village aggregation on the Slocan River, a tributary of the Upper Columbia River in the interior Pacific Northwest, North America. 14C dating of housepit deposits have revealed a complex occupational history, likely reflecting fluctuating demographic and habitation cycles beginning ca. 3100 cal BP continuing to approximately contact in the late eighteenth or early nineteenth centuries. Slocan Narrows was occupied through three millennia characterized by the establishment of a single founding pithouse with expansion into neighborhoods four times with only one substantial occupational building hiatus occurring from 2400–2000 cal BP. We interpret the occupational history to be indicative of founding houses, recruitment and/or reproduction for expansion, and competition between corporate groups at different scales. Following similar research methodology conducted at other villages in the interior Pacific Northwest, household and village occupational histories contribute to our understanding of the evolution of hunter-gatherer social complexity. This paper explores the link between detecting emerging social complexity at Slocan Narrows with current theoretical notions as how archaeologists have defined the term as well as how Indigenous Peoples view complexity when refereeing to ancestral populations.

[79] *Chair*

Goodale, Nathan [50] see Buff, Lindsay

Goodbred, Steven (Vanderbilt University), Mario Pino (Universidad Austral de Chile) and Tom Dillehay (Vanderbilt University)

[382] *Holocene Geology and Paleoenvironmental History of the Lower Chicama River Valley and Coast*

This paper focuses on reconstructing the Holocene paleoenvironmental history of the lower Chicama River valley and coastal system, which has provided diverse natural resources for the Preceramic cultures at Huaca Prieta and Paredones. The archaeological site of Huaca Prieta is situated on the southern tip of a Pleistocene terrace along the shore, ~3 km north of the Chicama River mouth and floodplain system. Paredones is located 0.6 km to the north on the eastern edge of the terrace. Here we present the results of a geological investigation of sediment cores, outcrops, and surface morphology from the coastal plain and lower Chicama River valley. From these data we reconstruct the Holocene paleoenvironmental history of the area around Huaca Prieta and Paredones, which represent the natural landscape and resources available to the early cultures living there.

Gooderham, Ellie (Simon Fraser University), Luisa Marinho (Simon Fraser University), Laure Spake (Simon Fraser University), Shera Fisk (Simon Fraser University) and Ana Luisa Santos (University of Coimbra)

[235] *Severe Skeletal Lesions and Loss of Bone Mass in a Child Associated with a Case of Spinal Tuberculosis and Prolonged Immobilization*

This paper describes the lesions identified in the skeletal remains of a nine-year-old girl who died of pulmonary tuberculosis in Lisbon, Portugal, in the 1940s. This individual is housed in the skeletal collection at the National Museum of Natural History and Science, Lisbon. These remains show a variety of lytic lesions on the ribs and thoracic vertebra, with complete destruction of the bodies and fusion of the vertebral arches of four vertebrae at a 60 angle. The individual was likely bedridden for a prolonged period, which is reflected by abnormal size and shape changes to the pelvis and leg, including loss of bone mass, stunting of the long bones, premature fusion of epiphyses, and bone erosion. This clinically diagnosed case is one of the few examples of confirmed juvenile skeletal tuberculosis prior to the antibiotic era. As such, it provides a reference for the skeletal modifications which may be expected in archaeological tuberculosis cases.

Gooderham, Ellie [235] see Marinho, Luisa

Goodwin, Rebecca (University of Western Ontario) and Lisa Hodgetts (University of Western Ontario)

[35] *Foxy Ladies: Investigating Human-Animal Interactions at Agvik, Banks Island*

Outstanding organic preservation at many Arctic sites gives archaeologists access to large artifactual and faunal assemblages through which to examine human-animal interactions. However, much of the research focused on these interactions conceives them not only in ecological/economic terms, but also examines them at the level of entire communities (e.g., zooarchaeological studies of subsistence) or focuses on the predominantly male realm of hunting. The Arctic ethnographic record reflects a strongly gendered division of labor. We therefore suggest that at least some elements of human social interactions with nonhuman animals were strongly gendered as well. In a case study from a 500-year-old Inuit dwelling at Agvik (OkRn-1) on Banks Island, we examine the material evidence for the ways in which women and men engaged with a range of animal species in their daily lives. One dwelling at Agvik contains a number of unusual features suggesting that the preparation of fox skins was an important activity at the site. Over 90 slate uluit (women's knives) were recovered in addition to a possible symbolic cluster of fox crania. We go on to consider the implications for human social relationships with these animals.

Goralski, Craig T. (Cypress College)

[14] *Is There Strength in Numbers? An Evaluation of the Complementary Roles of Archaeologists and Anthropologists in Forensic Contexts*

This paper explores the training and education that forensic anthropologists and forensic archaeologists have traditionally received, and how it is put into practice in forensic contexts. The substantial differences in theory, method, and practice between the two subdisciplines will be summarized and how these differences shape what each can contribute in the field will be discussed. This paper will argue that although some overlap between the two subdisciplines exists, contemporary anthropology contributes in forensic contexts best when forensic anthropologists collaborate with forensic archaeologists and vice versa. Whether a more integrated model merging forensic anthropology/archaeology education and training is tenable will be assessed using previous field schools conducted by the author and colleagues as test cases.

Goranson, Steve [341] see Hoffman, Brian

Gordillo Begazo, Jesús (Universidad Privada de Tacna) and Colleen Zori (Baylor University)**[202]** *Resultados preliminares del Proyecto Moqi (Peru): Explorando la administración inkaica en el departamento de Tacna*

Moqi es un asentamiento Inca ubicado entre las cuencas de los ríos Cambaya y Borogüeña, a 2,8000 msnm, en la cabecera del río Locumba (Tacna, Peru). Las investigaciones (2012–2014) buscaron ampliar el conocimiento de las características arquitectónicas de Moqi Alto y Moqi Bajo, la producción del sitio arqueológico, las relaciones entre su población y el vínculo económico, social y cultural con el Estado Inca. Los primeros resultados, en el contexto de la hipótesis planteada (que propone que Moqi parece representar un clásico modelo de "centro de control administrativo" de los espacios productivos instalado por una élite demandante de las políticas del Estado Inca), nos revela un conjunto de rasgos que aseveran la complejidad de la producción del sitio arqueológico, diseño arquitectónico y espacial de Moqi Alto frente a la arquitectura más modesta de Moqi Bajo, y la producción del sitio arqueológico que nos hace pensar en una función diferente y probablemente complementaria de sus sectores. También se buscó conocer las características estructurales del sitio, los elementos arquitectónicos constructivos (tipos de roca y argamasa) y el sistema de circulación a través del análisis de la composición arquitectónica.

Gordon, Gwyneth [8] see Pacheco-Fores, Sofia

Gordon, Steffan (University of British Columbia)**[72]** *Back to the Earth: Construction and Closure of a Late Shang Dynasty Structure.*

Excavations at the locus of Tongle Huayuen in the Late Shang Dynasty (ca. 1250–1046 BCE) capital site of Yinxi, near the modern city of Anyang, uncovered the remains of a small aboveground earthen structure (2015ALNF1). The recovery of wall and ceiling remains, much of which displayed considerable fire-reddening, from refuse pits associated with building foundations provided the opportunity to examine nonelite, non-palatial architecture in greater detail than has generally been possible at Shang Dynasty sites, due to the frequently poor preservation of earthen building materials. Comparison of these remains with those recovered from the palatial courtyard buildings at the Middle Shang city site of Huanbei, as well as the published descriptions of the remarkably preserved Early Shang structures at Gaocheng Taixi, provides valuable insight into the variation that existed within Shang Dynasty building practices and draws attention to avenues for future research. In addition, heating sediments dating to the Shang Dynasty under controlled conditions allows exploration of the conditions under which 2015ALNF1, and the palatial structures from Huanbei were abandoned and destroyed, which may have involved some kind of ritual closing activity.

[72] *Chair***Gore, Angela (Center for the Study of the First Americans, Texas A&M University)****[184]** *Eastern Beringian Toolstone Procurement: Investigations of Fine-Grained Volcanics in the Nenana Valley, Interior Alaska*

Investigating prehistoric landscape use is significant in understanding adaptive strategies in the Late Pleistocene and early Holocene. One way to begin to address landscape use is through lithic procurement and selection studies; these are significant in understanding prehistoric human behavior because procurement and selection behaviors shape tool kits, mobile strategies and settlement patterns. An initial step in addressing these problems is attempted through examining lithic artifacts from Dry Creek and Little Panguingue Creek, two Nenana Valley sites dating from the Late Pleistocene to Holocene containing artifacts produced on volcanic materials such as basalts, rhyolites and dacites. We can geochemically characterize these toolstones through portable X-ray fluorescence (pXRF) analysis to explore toolstone use in the valley. This presentation reports preliminary results of my 2016 dissertation research and compares geochemical data from Nenana Valley sites (Dry Creek and Little Panguingue Creek) with geochemical signatures obtained from both primary outcrops and local alluvium sources to establish how local volcanic materials were utilized by prehistoric Alaskans in the Nenana Valley through time.

Gore, Angela [332] see Puckett, Neil

Goriunova, Olga [330] see Shepard, Ben A.

Gorman, Alicia (UC Santa Barbara)**[308]** *A Ceramic Investigation into the Relationship between Emergent Complexity and Religion on the South Coast of Peru*

This paper investigates negotiations of power on the south coast of Peru through ceramic attribute analysis. The ceramic sample comes from the site of Cerro Tortolita, which contains both ceremonial and habitation zones. This site's emergence in the upper Ica Valley during the third century AD coincided with a broader increase in local settlement hierarchy. The timing of Cerro Tortolita's rise and its religious nature provide a unique opportunity to isolate and investigate the relationship between religion and emergent inequality. Although inequality was once thought to be an inevitable transition on the road to progress to Western civilization-like complexity, it is now recognized that societies have social norms and leveling mechanisms that actively maintain distributions of power. For inequality to arise, social norms and limitations maintaining equality must first be overcome, and religion is one means of doing so. The hypotheses tested through this work concern use of space within the ceremonial zone of the site, and what this can tell us about elite strategies for power and how regular people shaped those strategies. By studying the power dynamics at Cerro Tortolita, we can better understand the potential of religion in emergent inequality.

[147] *Discussant*

Gosling, Anna [340] see Matisoo-Smith, Lisa

Gosner, Linda (Clark University)**[166]** *Mining, Migration, and Movement in Roman Iberia*

The Iberian Peninsula was a rich source of metals in antiquity, and indigenous people practiced mining in many areas from at least 4000 BCE. Following Roman conquest of the region in the late third century BCE, the scale of mining increased dramatically to accommodate the growing needs of the Roman Empire from the production of coins to the creation of urban water infrastructure. This growth catalyzed episodes of migration of people and movement of materials in ways that stimulated both regional and empire-wide connectivity. In this paper, I explore these changing patterns of movement—both of people and goods—in and out of major mining districts in southern Iberia. I argue that the migration of Italians into Iberia soon after Roman conquest contributed to the diversification of communities in the countryside, and the development of lasting connections between these areas and other parts of the empire. By contrast, in later centuries, increased movement of people and goods within the peninsula stimulated connectivity

regionally, increasing provincial ties. Understanding connectivity brought about by the demands of mining ultimately sheds light on the relationship between natural resources, the formation of diverse communities, and the creation of empire in Roman Iberia.

[166] *Chair*

Goudge, Charlotte (University of Bristol)

[377] *Seeding Colonialism: European Trade Beads within Native American Contexts*

The typological and scientific study of trade beads in Native American contexts has contributed a great deal to understanding contact period sites (ca. 1607–1783). The Cape Creek site, NC, is a perfect example of British-indigenous connectivity in the contact period and is important for understanding interaction in the Southeast. Unlike other studies of this type that mostly focus on mortuary sites, Cape Creek is a village settlement and will therefore provide a different view of day-to-day bead usage in a domestic context. This paper will discuss the change of field methodologies that allowed for increased detection of beads within the complicated strata of Cape Creek, and will also apply previous methodologies to analyze the beads and discuss possibilities for dating and sourcing.

[93] *Discussant*

Goudiaby, Hemmamuthé (UMR 8096 ArchAm) and Lydie Dussol (UMR 8096 ArchAm)

[174] *Ashes to Ashes, Dust to Dust: The Role of Wood in Ancient Maya Funerary Sequences*

From 2014 to 2016, the intensive excavation of the residential unit 5N6 in Naachtun (Guatemala) has yielded 13 burials intricately linked with the evolution of the architecture. Put together, these funerary contexts allow for a fine-scale reconstruction of the local dynamics and everyday life in the unit. However, funerary archaeologists often fail to consider the burial itself as a micro-context, a combination of significant gestures and actions that can be analyzed using the same principles as those used in a larger scale. The presence of layers of ashes and charcoal in the ancient Maya burials is a very well-known fact. Spatial analysis adapted to the dimensions of single burials demonstrate the existence of ritualized, cultural selection of the woods rather than random deposits. When combined with archaeoethnology, this fine-scale analysis gives us a new insight on ancient Maya funerary practices as a whole.

Gould, Peter (University of Pennsylvania Museum)

[70] *Value and Impact: The New Philanthropy and Funding Archaeology*

In an era of globally declining government funding for culture, including archaeology and heritage, the philanthropic sector will loom increasingly important to funding this discipline. Major philanthropic organizations and individual philanthropists increasingly are seeking to define and measure the impact of the causes they fund. That “impact” may be social, economic, political, or cultural, but in all cases the essential element is a set of clearly defined impact metrics. This change in perspective is compelling those seeking funds to define in a measurable and meaningful way the difference that their work makes in the world. Increasingly, causes and projects that have relied on donor enthusiasm or emotional attachment to the activity will encounter resistance from a new generation of mission- and impact-focused donors. This paper will explore this emerging terrain and consider both alternative approaches to evaluating the impact of archaeology and the implications of these trends for those seeking funding for archaeology-related projects. Examples will be drawn from a number of different sectors in order to illuminate both the nature of impact philanthropy and the variety of approaches available to address donors’ emerging requirements for impact data.

[70] *Chair*

Graesch, Anthony (Connecticut College) and Corbin Maynard (Connecticut College)

[260] *An Archaeology of Illegal Garbage Dumping in the Twenty-First Century*

A boon to the archaeological study of American lifeways in the past and present, the massive assemblages of discarded objects at landfills poignantly speak to an era of unrivaled consumption and waste. Aggregated through municipally sanctioned collection services, these assemblages, however, are rarely representative of the full range of household-level discard behaviors. Illegal dump sites, in contrast, comprise assemblages that cannot be easily or quickly discarded through regular garbage collection utilities. As such, illegal dump sites implicate economies of garbage that are otherwise not evident or, at best, poorly represented at municipal landfills. In this poster, we present data generated with the application of archaeological methods to the study of recent illegal garbage dump sites in southeastern Connecticut. We argue these sites represent discard decisions that are undergirded by ideologies of elusion and, sometimes, subversion. Some dump sites afford analyses of small social group behavior, such as household life cycling. Others permit the study of individual histories and modern processes of loss and “accidental” deposition. All provide opportunity to evaluate the ways that broader structures shape expressions of nonconformity and the ways that nonconformity is materialized in the archaeological record.

Graesch, Anthony [260] see McKenna, Moriah

Graf, Kelly, Julie Esdale (CEMML, Colorado State University), Ted Goebel (CSFA, Anthropology, Texas A&M University), Grant Zazula (Yukon Government) and Aureade Henry (CEPAM, University of Nice)

[47] *Investigations of Late Glacial Occupations at the McDonald Creek Site, Central Alaska*

In 2013 our team began testing the recently-discovered McDonald Creek archaeological site, located in the Tanana Flats, Central Alaska. To date we have excavated a total of 15 m². The site contains evidence of a set of living floors dating to the Middle Holocene, Younger Dryas, and early Allerød. Our tests have revealed thousands of archaeological materials, including lithics and faunal and floral remains, associated with domestic features such as hearths and possible dwellings. We are analyzing materials collected thus far and preparing for full-scale excavations beginning summer 2017. This paper reports initial results of geochronological, lithic, zooarchaeological, and paleoethnobotanical analyses and places the site in the context of eastern Beringian prehistory.

[226] *Chair*

Graf, Kelly [226] see Goebel, Ted

Graff, Sarah (Arizona State University) and John Marston (Boston University)

[21] *Phrygian Cuisine at Kerkenes: A Synthesis of Ceramic and Botanical Evidence for Food Storage and Cooking*

At the Iron Age site of Kerkenes in Central Turkey, researchers are using different analytical methods to study cooking and food preparation. Evidence for cooking pots and other ceramic containers used for preparing, storing, and cooking food are found together with a variety of botanical remains. A new project at the site initiated the complementary analysis of ceramic container production and use with plant preparation, storage, and consumption. Situating these data in context, taking advantage of a site-wide destruction preserving features related to cooking, tools related to food preparation, and

faunal remains, this project is able to discover new and complementary information on cooking and food preparation. These complementary analyses will make it possible to learn more about the choices people made in the past and discover insights about the different social practices at this large urban center.

Graham, Elizabeth [9] see Pierce, Karen

Grant, Christopher (University of Chicago)

[103] *Copper and Bone: Craft Labor and Aesthetics in the Early Creole Faubourgs of New Orleans, 1790–1865*

The early residents of the Creole faubourgs have long been recognized as contributors to the development of New Orleans's unique aesthetic traditions. Indeed many of the city's most iconic architectural forms and cultural practices were forged in these neighborhoods—semi-peripheral spaces where people from a variety of local and trans-Atlantic backgrounds came together to re/define and embody the meaning of “Creole” in the nineteenth century. But much of the details about the labor that built these physical and social communities—the physical work of enslaved laborers and free people of color—has been eclipsed by dominant narratives that privilege more recent developments in the city's history. This is particularly true of Faubourg Tremé, the neighborhood that gave birth to jazz but was also the location of the city's earliest plantations. This paper employs recent archaeological findings from one of these early plantations to examine the physical traces of the labor that built the Creole city. From buttons to furniture hardware, it asks, What are some of the material traces of Creole aesthetic traditions? and How did craft labor assist in the building and making of new urban communities at the turn of the nineteenth century?

Grant, Larissa [17] see Rowley, Susan

Grant, Vernelda (San Carlos Apache Tribe)

[295] *Discussant*

Grasset, Sebastián [143] see Méndez, César

Grattan, John [274] see Jenkins, Emma

Gratuze, Bernard [178] see Bonneau, Adelphine

Grávalos, M. Elizabeth (University of Illinois at Chicago) and Rebecca E. Bria (Vanderbilt University)

[232] *Preliminary Compositional Analysis of Raw Clays and Ceramic Pastes from the Callejón de Huaylas, Highland Ancash, Peru (ca. 200–800 CE)*

Located in north-central Peru, the highland Ancash region sits at an important geographic and scholarly intersection. Despite its position as a main thoroughfare between the northern and southern sierra, it is often neglected during discussions of the increased interregional interaction of the Middle Horizon (ca. 700–1000 CE). This period is characterized by the expansion of the Wari state out of the south highlands. There remains much to be known about the Middle Horizon in highland Ancash, particularly the involvement of local groups in trade networks. Here we present the preliminary results of compositional analysis of ceramic pastes and raw clays undertaken at the Field Museum's Elemental Analysis Facility in order to shed light on the organization of production and the movement of pottery prior to and during Wari expansion. Our ceramic samples span the Early Intermediate Period (ca. 1–700 CE), including Recuay style fancy kaolinite wares, and the Middle Horizon, and were obtained from eight different sites in the Callejón de Huaylas region. By including such a broad sample, we tentatively identify zones of production and propose further testable hypotheses about the nature of interaction during the Middle Horizon.

Grávalos, M. Elizabeth [62] see Penfil, Rachael

Grave, Peter [27] see Kealhofer, Lisa

Gravel-Miguel, Claudine (Arizona State University)

[38] *Using ABM to Evaluate the Impact of Topography and Climate Change on Social Networks*

Anthropological research suggests that climate and environmental resources influence the lifestyle of hunter-gatherers. My research uses an agent-based model to generate test expectations related to the impact of different geographical and social environments on the social networks formed therein. It focuses on Magdalenian social networks created in the Cantabrian and Dordogne region, and visible through similarities of portable art representations. The regional resources and climate of the period are re-created through ecological models and downscaled paleoclimatic data, respectively. The model also uses realistic DEMs and a human-informed version of least-cost path to reproduce possible traveling routes between fake archaeological sites. The expectations generated are tested through a stylistic study of Magdalenian portable art objects. This presentation will demonstrate the potential of combining computer models with empirical data to increase our understanding of prehistoric social dynamics.

Graves, Michael W., Joseph Birkmann (University of New Mexico) and Kekuewa Kikiloi (University of Hawai'i, Manoa)

[302] *Integrating Archaeological and Historical Information to Identify Agricultural Features and Reconstruct Traditional Hawaiian Irrigation Networks in Windward Kohala, Hawai'i Island*

Where landscapes have been modified by recent development, identifying surface archaeological features requires a different analytical approach. In windward Kohala, Hawai'i Island, after more than 150 years of land conversion to commercial agriculture features that comprised traditional Hawaiian irrigation agriculture have been mostly obscured. To address this, several sources of information were collected including historic documents and maps, previous and recent archaeological surveys, and remote sensing. These were georeferenced, converted to GIS files, and combined. From this it was possible to reconstruct not only the locations and extent of former fields and irrigation ditches, but also to identify the spatial linkages among them. Agricultural networks were formed that linked water sources from streams in the uplands with ditches and natural drainages to deliver irrigation to a series of plots and fields at lower elevations. Water was transported out of its stream drainage onto neighboring ridge lands where plots were

established and occasionally diverted into other drainages. These networks not only linked agricultural features across the landscape, they also crossed traditional community boundaries suggesting cooperative organization at larger social scales dated from AD 1650–1850.

Graves, Michael W. [346] see Birkmann, Joseph

Graves, William

[129] *Household and Political Economy in Ancient Hohokam Society*

Examining household-level economic behaviors has long been a means for archaeologists to explore social and political organization in ancient Hohokam society. In this presentation, I reflect on the training and influence of Katherine Spielmann in my thinking about the economic roots of inequality in small-scale societies and begin to outline an explicitly political-economic framework to explore the structure and bases of power among the Hohokam of southern Arizona. The Hohokam household was the locus of crucial relations of production and it was households who controlled both the means of production and productive labor. I argue that Hohokam households exploited production and labor to compete with one another for political power. Inequality was created and experienced through a relative ranking of households based on control, exploitation, and competition. Understanding changes in the relations of production and how production and labor may have been controlled can help us model changes in the nature of power and the experience of inequality throughout Hohokam history.

[129] *Chair*

Gravlin Beman, Ashley (Florida Atlantic University)

[326] *A Seriation of Local Ceramics from Cosmapa Oriental, Department of Chinandega, Nicaragua*

Many local ceramic wares in northwestern Nicaragua are, as of yet, undescribed. Excavations at the site of Cosmapa Oriental in the municipality of Chichigalpa, Department of Chinandega, Nicaragua were conducted by Dr. Clifford Brown of Florida Atlantic University in 2013. Analysis of the ceramic sample in 2015 revealed two occupational periods at the site: a Late Preclassic occupation related to cultures in El Salvador; and a Classic to Early Postclassic occupation, which include Las Vegas and Ulúa Polychromes. This paper will introduce a seriation and description of the Classic to Early Postclassic local ceramic wares recovered from the site of Cosmapa Oriental. The Cosmapa seriation was constructed using the Type: Variety-Mode system, however, emphasis was maintained on paste characteristics. The main local paste is soft and friable, brown to buff, with medium sub-angular volcanic grit temper. Cosmapa wares include an unslipped type and a few types with buff, red, and black slips. Incision and punctuation are common ceramic decorations on both unslipped and slipped variations, while we have noted appliqué and the use of stucco on unslipped varieties. This seriation will be the first description of local ceramics from the Department of Chinandega, Nicaragua.

Gray Jones, Amy (University of Chester)

[139] *Manipulation of the Body in the Mesolithic of North-West Europe*

This paper seeks to situate the phenomena of “loose” human bones in the Mesolithic of north-west Europe within a wider understanding of the role of post-mortem manipulation of the body in the mortuary practices of these Mesolithic hunter-gatherers. While originally interpreted as the remains of disturbed burials, assemblages of disarticulated human remains have begun to be accepted as evidence for alternative mortuary practices, though their specific nature has so far received little critical attention. Recent doctoral research, based on detailed osteological analysis, has identified the specific processes and practices that were undertaken at a number of sites across Europe. This material is considered against the background of evidence for Mesolithic mortuary practice which displays enormous variation in the treatment of the body after death. While “loose” human bones may seem isolated to us, I argue that the practices and processes that produced these remains, and their deposition in the landscape, involved them in relationships with other objects, places and (living) people, revealing Mesolithic attitudes to persons, bodies and death.

Greaves, Russell (Peabody Museum, Harvard) and Karen Kramer (Department of Anthropology, University of Utah)

[44] *Ethnoarchaeology of Natural Solution Cavities as Water Sources Affecting Settlement and Economic Activities in a Yucatec Maya Community, Mexico*

Ethnoarchaeological investigations in the Yucatec Maya community of Xculoc recently included inventorying the location and uses of a range of small-large water sources. This karst landscape has no surface rivers, ponds, or lakes. Currently, the community uses a deep well at the former hacienda in this location. However, at least 60 years ago most families that coalesced into this village were distributed in relation to smaller reliable water sources near the current community location. Field research located the known water sources and their uses. These solution cavities in the limestone bedrock range from large and deep sources that contain water year-round fed by vadose water flow to small and ephemeral pockets that are seasonally filled by rainfall. All of the identified water sources (sartenejas, aguadas, and cenotes) are maintained and still used at least periodically for apiaries, incidental agricultural use, laundry washing, drinking water sources for groups working away from the village, and as locations to check for game during hunting trips. Our research addresses how these sartenejas and aguadas can be used to study past settlement in the region of Xculoc, as well as past and present economic activities.

Gredell, Erin [365] see McRae, Ryan

Green, Eleanor [50] see Yang, Dongya

Green, Kirsten (University of Montana)

[357] *Maya Mortuary Practices over Time and Space: The Effects of Sociopolitical and Environmental Change on Mortuary Practices and the Statistical Analysis of Trends in Mortuary Characteristics*

Mortuary practices are created to convey something about the deceased individual, as well as their surviving relatives, but can also give insight into the religious, social, and political structure of the community. This paper focuses on Maya mortuary practices in Belize, and how/why those practices changed over the transition from the Formative period (2000 BC–AD 300) to the Classic Maya florescence (AD 300–800). Comparing differences of mortuary characteristics within and between communities, time periods, and/or geographic regions can tell us about the differing political systems, social stresses, population movement, kinship relationships, and ecological changes that may have effected change to a religious structure. Mortuary practices are consistently used as a proxy that reflects the complexity of the sociopolitical structure and distribution of the population allowing for bioarchaeologists and mortuary archaeologists to infer social structure, religious beliefs, population demographics, and political or ecological shifts. The Classic Maya were known for their complex ritual, social, and political structures and this chapter will identify trends in Maya mortuary practices and discuss reasons for those trends. Specifically, questions of how the complex mortuary ritual came about and how social, political, and environmental stresses were reflected in the treatment of their dead.

Green, Stanton (Monmouth University)**[65]** *Discussant***Greenberg, Raphael****[141]** *Wedded to Privilege? Archaeology and Academic Capital*

If archaeology is by definition strongly attached to certain academic ideals (or “scholastic fallacies”), to a particular secular, rationalist way of looking at the world, and to ever-proliferating specializations that require scarce technological resources and expertise; and if, moreover, academic symbolic and cultural capital is constantly and increasingly measured by membership in the correct status groups and by access to these scarce resources, can academic initiation of, or even participation in, community-based heritage and memory work ever be more than lip-service? On the other hand, if the basis for archaeology is, ultimately, field-work, i.e., a physical presence in, and impact on, real, inhabited places, does academic archaeology have a future without recourse to communities? What is the political, ethical and scientific cost of an archaeology that is wedded to privilege?

Greene, Lance (Wright State University)**[128]** *Cherokee Participation in the Southern Slave Society*

On the eve of the Removal during the Early Republic era, most Cherokees still practiced traditional modes of subsistence farming and participated in local economies. At the same time, a small but influential segment of the Cherokee Nation was completely entrenched in the capitalist economy, operating large-scale plantations, businesses, and other ventures. These Cherokees were participants in the slave society of the southeastern United States in two ways; they owned African-American slaves, and they produced surplus crops, livestock, and goods that were sold to white plantation owners in the Lowcountry South. Most of these wealthy Cherokees lived in northern Georgia, which held the most extensive agricultural lands of the Cherokee Nation. However, small numbers of Cherokees also participated in the market economy in other parts of the Cherokee Nation. Documentary research on and archaeological investigations at the plantation site of a Cherokee family in the mountainous region of western North Carolina reveal how this family used their wealth to avoid forced Removal, to assist other Cherokees to remain in the area, and, ironically, to maintain some traditional aspects of Cherokee life. Their story reveals local complexities of capitalism, race, and class in the antebellum South.

Greene, Alan (New York University)**[221]** *Regional Political Economies in the South Caucasus: Tracing Social Boundaries in a Eurasian Context*

After more than a century of Russian Imperial and Soviet research dominated by the excavation of tumulus burials, researchers in the South Caucasus have now spent two decades investigating exactly how settlement archaeology sheds light on the inhabitants of the region's earliest polities (ca. 1500–1150 BC). Most of this data has emerged from the sites of the Tsaghkahovit Plain, which have served as a micro-regional laboratory for Bronze and Iron Age studies since 1998. But how exactly do these local models of political organization and economic life articulate with the broader dynamics of circulation, boundaries, and human movement that tied the residents of the South Caucasus into a regional ecumene with a common sociopolitical vocabulary? What relates our understandings of site-based devotional life, bodily adornment, and commodity stockpiling to the flows of people and products that traversed political communities? Data from the Kasakh Valley Archaeological Survey of Project ArAGATS are now providing access points to these regional aspects of society and economy. At the same time, they are illuminating the paths and stakes of geographically extensive political archaeology more generally.

Greene, Elizabeth [240] see Daniels, Megan

Greening, Spencer (Gitga'at First Nation), Dana Lepofsky (Dept. of Archaeology, Simon Fraser University, Bur), Mark Wunsch (Greencoast Media, Quadra Island, BC) and Nancy J. Turner (Environmental Studies, University of Victoria, BC)**[77]** *The Historical Ecology of Laxgalts'ap: A Cultural Keystone Place of the Gitga'ata of Northern British Columbia*

For many Indigenous Peoples, their traditional lands are archives of their histories, from the deepest of time to recent memories and actions. These histories are written in the landscapes' geological features, the plant and animal communities, and associated archaeological and paleoecological records. Some of these landscapes, recently termed “Cultural Keystone Places” (CKPs), are iconic for these groups and have become symbols of the connections between the past and the future, and between people and place. Using an historical ecological approach, we describe our novel methods and initial results for documenting the history of Laxgalts'ap (Old Town) in the territory of the Gitga'ata. We combine data and knowledge from diverse disciplines and communities to tell the deep and recent histories of Laxgalts'ap. This CKP encompasses expansive landscapes and diverse habitats transformed by generations of people interacting with their surrounding environments. Documenting the “softer” footprints of past human-environmental interactions can be elusive and requires using diverse approaches and novel techniques.

Greening, Spencer [176] see Chalmer, Nyra

Greenwald, Alexandra

[381] *Fertility in Ancient California: Life History Strategies and Implications for Demographics, Resource Intensification, and Social Organization*

Human behavioral ecology predicts that individuals alter reproductive strategies in response to environmental and social conditions. I consider stable isotope measures ($\delta^{15}\text{N}$ and $\delta^{13}\text{C}$) of weaning age, parental provisioning, and child foraging derived from human tissues as proxies for the reproductive strategies employed by prehistoric hunter-gatherer populations from Central California over a 6,000-year period. Shifts in weaning age and childhood diet over time suggest reduced parental investment associated with the Medieval Climatic Anomaly (MCA) (1100–700 BP), a period noted for severe episodic droughts and general environmental and social disruption. The decline in mean weaning age and associated shortening of inter-birth intervals during the MCA is consistent with the hypothesized offspring quantity-quality trade-off. This change in life history strategy initiated a cycle of population growth and resource intensification that drove adaptive shifts in settlement patterns and sociopolitical structure, ultimately resulting in native Californian's high population density and unique tribelet organization.

[381] *Chair*

Greenwald, Alexandra [219] see Martinez, Marcos

Greer, John [273] see Greer, Mavis

Greer, Mavis (Greer Archeology)**[273]** *Signage Effectiveness as Rock Art Protection*

Site signage has long been used to inform people of the importance and fragile nature of rock art and consequences of damaging the images and related cultural remains. Many styles of signs, with variable content, amount of information, and degrees of threatened legal action, have been used around the world, and their effectiveness may be evaluated by damage to the sign, associated rock art, and surrounding landscape. Other factors, such as fences, walkways, distance from roads, and presence of site overseers, may also influence a sign's effectiveness. Recommendations are made as to the most effective sign styles, placement, and contents.

[273] *Chair***Gregory, Andrea (Archaeological Consulting Services, Ltd.) and Alanna Ossa (State University of New York at Oswego)****[335]** *Life between Two Rivers: A Study of the Sedentary to Early Classic Transition on the Queen Creek Delta, Arizona*

Disruption of exchange networks and settlement patterns during the late Sedentary to early Classic period transition has been well documented along the middle Gila River Valley. Previous research has suggested a trend in population relocation from downstream Gila River sites such as Snaketown in favor of sites upstream such as the Grewe-Casa Grande complex during this time. Based on evidence recovered from residential contexts identified during the PVR FRS project, outlying areas situated along the Queen Creek delta and bajada show a continued occupation well into the Classic period, maintaining contact with middle Gila River communities throughout this transitional period. The PVR FRS project findings bridge the Sedentary and Classic occupation, offering a unique opportunity to analyze both continuity and fluctuations in exchange networks between the Hohokam settlements in Queen Creek and communities in the middle Gila and lower Salt Rivers during this time. The settlements identified from the PVR FRS project also show increasing involvement with ceramic production and potentially botanical resources into the early Classic period, supporting their importance in helping us understand the circumstances of increasingly localized production identified during that era.

Greig, Karen (University of Otago), Elizabeth Matisoo-Smith (University of Otago) and Richard Walter (University of Otago)**[181]** *Tracking Dogs Across the Pacific Using Ancient Mitogenomes*

Dogs were introduced to the islands of Australasia and the Pacific during human migrations and colonizations, but the timing and dispersal routes are unclear. To investigate these Oceanic dog introductions and movements, we generated complete or near complete ancient mitochondrial genomes from archaeological dog specimens from Thailand, Island Southeast Asia and Pacific islands, and from modern dingoes. When combined with additional published complete mitogenome sequences from modern dogs from Southeast Asia and New Guinea, and Australian dingoes, a complex history of dog-human interactions and multiple introductions into the region is revealed. This complexity is also mirrored in archaeological and linguistic evidence.

Greig, Karen [340] see Matisoo-Smith, Lisa

Gremlion, Kristen (Ohio State University)**[388]** *Discussant***Grenda, Donn (Statistical Research, Inc.)****[206]** *Discussant***Grier, Colin (Washington State University) and Grant Keddle (Royal British Columbia Museum)****[393]** *Tracing the World's Edge: Northwest Coast interactions with the external world*

In this paper, we address the extent to which Northwest Coast societies, and specifically those of the Salish Sea, were engaged in, participated in, or were connected to an external world beyond their own perceived borders. We consider four elements of the problem. First, we examine ethnographic data pertaining to the spatial extent of the known world, and trace its borders. We then consider the flow of exogenous and exotic materials into the Northwest Coast over time, and assess the significance and role of these items in local contexts. We also consider these materials from the perspective of movement of ideas and symbolic frameworks, and address whether they were utilized in specific ways in the construction of status, power and inequality. Finally, we assess the degree to which it can be argued that external connections mattered for cultural change on the Northwest Coast, and whether there is a case that Northwest Coast societies exported materials or concepts to other regions. All told, data suggest that while external connections were evident, the Northwest Coast may have been quite locally focused through its long history, reflecting the strong role of place in cultural frameworks of the region.

Grier, Colin [181] see Hawthorne, Paige

Grieve, Johnathan (Stantec Consulting Ltd.) and Whitney Spearing (Simon Fraser University/Sugarcane Archaeology)**[100]** *Geochemical Analysis of Baezaeko River and Baker Creek Dacite*

Lithic artifacts produced from fine-grained volcanic (FGV) toolstone material, such as dacite, dominate archaeological assemblages from the Interior Plateau of British Columbia. While this heavy reliance on locally or regionally available FGV has been previously well documented, subsequent geochemical analysis has predominately focused on material from well-known procurement sites or sources located within the central and southern portions of the Interior Plateau. In this paper, we present the geochemical analysis of geological samples representing two heavily utilized FGV toolstone materials collected from the vicinity of the Baezaeko River and Baker Creek drainages located within the northern extent of the Plateau. Utilizing portable X-ray Fluorescence (pXRF), Inductively Coupled Plasma-Emission Spectroscopy (ICP-ES), and Inductively Coupled Plasma-Mass Spectrometry (ICP-MS), we examine the geochemical fingerprint of these two proposed sources of FGV toolstone, and offer a comparison of the trace element analyses from each technique.

Griffin, Dennis (Oregon State Historic Preservation Office)**[107]** *In Search of Camps' Warner: Tracking U.S. Military Presence in the Warner Valley, Oregon 1866–1874*

Following the discovery of gold and growing reports of trouble in eastern Oregon, the U.S. Military established a series of four forts to protect settlers and miners flocking to this part of the state and to insure continued use of local military roads. One of these forts, Camp Warner, served as the primary military fort in the Warner Valley from 1866 to 1874. Camp Warner actually consisted of two separate fort locations; old Camp Warner in use from 1866–

1867, and new Camp Warner in use from 1867–1874. In its heyday, Camp Warner consisted of over 80 structures that housed over 270 men along with some officers' families and served as an important military outpost during both the Snake (1866–1868) and Modoc (1873) Wars. This paper outlines recent attempts to relocate both fort sites, now located on both private and federal lands, and to determine their state of preservation. To facilitate the abandonment of Old Camp Warner to its new location to the west, a stone bridge was constructed across wetlands that were part of the Warner Lakes. The site of this bridge was also relocated and evaluated.

Griffin, Robert [131] see Saturno, William

Griffith, Cameron S. (Texas Tech University), Adam Spring and Brent Woodfill

[386] *Comparisons and Contrasts of Digital Imaging Technologies in Subterranean Mesoamerica*

Over a period of just a few short years there have been dramatic advancements in digital imaging and scanning technologies. Increasingly, cave archaeologists around the world are utilizing many of these new platforms and techniques to document subterranean artwork. This paper outlines two different approaches to digital imaging of ancient Maya cave art. In Guatemala, a Z+F IMAGER 5010C 3D Laser scanner, mounted on a tripod, was employed in Cueva San Juan and Hun Nal Ye to document both painted and carved artwork. In Belize, an Occipital Structure Sensor 3D scanner, mounted on an iPhone 6, was used to document monumental modified speleothem sculptures in Actun Halal. In addition to comparing and contrasting the methodologies, results, costs, time, and logistics involved in these two different archaeological endeavors, we provide suggestions for those who may be interested in carrying out similar initiatives in the future.

Griffith, Cameron S. [321] see Wyatt, Andrew

Griffiths, Seren (University of Central Lancashire)

[81] *New Romantic Archaeology: Radiocarbon Revolutions and Revolutions in Understanding*

This presentation will reflect on the so called four Radiocarbon Revolutions and their implications on archaeological narratives and theory generally, and Neolithic studies in Britain specifically. The timing of this reflection is critical given the implications of recent Bayesian analysis in order to produce precise, robust and probabilistic chronologies for parts of European prehistory. This paper will revisit the reactions to the initial radiocarbon revolutions by important theorists such as Colin Renfrew and David Clarke. Beyond this work there has been a marked lack of discussion of the implication that scientific dating has had and continues to have on archaeological theory as a whole. This paper will return to the considerations of the earlier radiocarbon revolutions by Clarke and Renfrew, as well as Wheeler, Childe and Sherratt to examine the implications for contemporary practice. Chiefly it will argue that the implications of earlier revolutions that Clarke identified have not been integrated with the newly available chronologies in archaeological practice. It will argue that glossing approaches as ordered "New" science, and relativist Romanticism is misleading, and will return to Wylie's emphasis on the importance of "tacking" between data and interpretation, which is especially relevant with our newly precise chronologies.

Grillo, Katherine (University of Wisconsin—La Crosse)

[314] *Discussant*

Grillo, Katherine [146] see Beyin, Amanuel

Grima, Reuben [133] see Malone, Caroline

Grimaud, Valentin [23] see Cassen, Serge

Grimes, Vaughan (Memorial University), Alison J T Harris (Memorial University), Ana T. Duggan (McMaster University), Stephanie Marciniak (McMaster University) and Hendrik Poinar (McMaster University)

[245] *Strontium and Oxygen Isotope Evidence for Maritime Archaic Mobility Patterns at the Site of Port au Choix-3, Newfoundland*

Recent archaeological and biomolecular investigations of the burial assemblage from the Maritime Archaic cemetery at Port au Choix-3, Newfoundland, reveal intriguing patterns of variability. New bone collagen stable isotope evidence supports significant dietary variation between individuals, and artifact-based analyses appear to indicate the site functioned as a meeting ground for different Maritime Archaic ethnic groups from within Newfoundland and the Atlantic region. When combined with previous osteological research on this burial assemblage that suggested nonspecific exogamy, these new data may reflect human mobility that potentially ranged across Newfoundland and into the mainland of Atlantic Canada. To test these ideas, we measured strontium and phosphate oxygen isotopes in tooth enamel from individuals representing all burial loci at Port au Choix-3. Our strontium and oxygen data suggests a differential pattern of mobility within the burial assemblage that appears to lend support to these new theories. Here we will present these results and discuss the implications for interpreting this important Maritime Archaic site.

Grimes, Vaughan [144] see Harris, Alison J T

Grimm, Eric [227] see Pilaar Birch, Suzanne

Grimstead, Deanna (Ohio State University), Jay Quade (University of Arizona) and Mary Stiner (University of Arizona)

[284] *Isotopic Evidence for Long-Distance Mammal Procurement, Chaco Canyon, New Mexico, USA*

Previous research on the prehistoric communities of Chaco Canyon, New Mexico (ca. AD 800–1250) provides evidence of an extensive procurement system of nonlocal food and economic goods. In this paper we use oxygen, carbon, and strontium isotope analyses to establish whether animal protein followed a similar pattern. We contextualized our analyses of the archaeofaunas from recent excavations at Pueblo Bonito with data on modern faunas across an area of ~100,000 km² around the site. Our results show that most archaeological deer, rabbits, and prairie dogs were obtained from >40 km away from Pueblo Bonito with the latter two likely being garden hunted. The Chuska Mountains west of Chaco Canyon and more distant San Juan Mountains to the north were the main source areas. These results closely align with previous results on architectural wood, corn, and other resources. The importation of small game animals suggests that the local supplies could not meet the needs of the community. Long distance meat procurement

may have been embedded within a more complex network of ritual-goods exchange or tribute that helped to offset the transport costs. Resource depletion may have contributed to the eventual abandonment of the region during the Medieval Warm Period.

Grinnan, Nicole [43] see Scott-Ireton, Della

Griset, Suzanne [59] see Milliken, Ian

Groesbeck, Amy [49] see Salter, Natasha

Groff, Amanda [219] see Dupras, Tosha

Grosman, Leore (Institute of Archaeology, Hebrew University) and Natalie Munro (University of Connecticut)

[95] *"Ashes to ashes, dust to dust": Natufian Cemeteries and Human Perceptions of Nature*

A chief source of information on archaeological cultures is gathered from excavated cemeteries. Burial location and treatment provide insight into many aspects of the daily life, social organization, and ideology of past human populations. In particular, the location and organization of human interments can reveal how past cultures perceived their natural surroundings and their place within them. Through burial, an individual returns to the soil of their homeland symbolizing the connections between nature, the living and the dead. We explore this connection by investigating the burial locations of the Natufians, the last Paleolithic culture in the southern Levant prior to the transition to early Neolithic entities. The unique cultural dynamics of the Natufian, shifts in subsistence strategies and the environmental setting of various sites are key for understanding the emergence of early agricultural communities. New insights into how this Natufian population perceived nature will be presented by investigating two very Late Natufian burial locations in Israel—Hilazon Tachtit cave in the western Galilee and Nahal Ein Gev II in the Jordan Valley, Israel.

Grossen, Christine [181] see Ferrari, Giada

Grossman, Ethan [30] see Wright, Lori

Grossman, Joel W. and Timothy C. Kenna (Department of Geochemistry, Lamont-Doherty Earth O)

[164] *Early Metallurgy from Waywaka in the South-Central Highlands of Andahuaylas, Apurimac, Peru: New AMS Dates and XRF Analysis*

This presentation will discuss the results of processing eight high-resolution Accelerator Mass Spectrometry (AMS) radiocarbon determinations on charcoal found in association with poorly dated ceramics and copper-alloy artifacts recovered from an important pre-Inca site, Waywaka, in the south-central highlands of Andahuaylas, Apurimac, Peru. Excavations at Waywaka revealed a naturally stratified series of deposits of Pre-Inca cultures spanning nearly four millennia. In the bottom-most layers was evidence of early pottery making and gold working in the Andes which included an actual gold worker's tool kit. Higher in the stratified sequence the excavation yielded a subsequent culture, the Qasawirka style, which produced a range of small (2–5 cm) copper-alloy artifacts. It is the antiquity of this early copper-alloy technology that is in question. It is the proposition of this AMS testing strategy that the Qasawirka style copper-alloy artifacts from the site of Waywaka could conceivably date to a significantly earlier period in Andean prehistory, possibly EIP—Early Intermediate Period. The presentation will also discuss these Qasawirka copper-alloy artifacts in terms of their constituent, non-copper, trace-elements using new portable XRF (X-ray fluorescence) scanning equipment at the Lamont-Doherty Earth Observatory (LDEO)/NASA laboratory of Columbia University.

Grossman, Kathryn (Massachusetts Institute of Technology)

[244] *Animals and Urbanization in Northern Mesopotamia: Late Chalcolithic Faunal Remains from Hamoukar, Syria*

This paper presents the results of a five year zooarchaeological study at the site of Hamoukar, a major Late Chalcolithic (fourth millennium BC) site in northeastern Syria. The Late Chalcolithic occupation at Hamoukar presents an excellent opportunity to study the social impact of foodways at an early urban site in northern Mesopotamia. When the site was destroyed by fire during the late fourth millennium BC, the occupants fled, leaving their goods and garbage behind in a well-preserved building complex. Excavations within these Late Chalcolithic buildings recovered intact floor assemblages that included many kinds of evidence for food management and consumption, including animal bones, ceramic vessels, and administrative devices for the control of access to stored goods. Excavations in exterior spaces also produced interesting data regarding food preparation and disposal, including numerous ovens and a dumping ground for animal carcasses. In this paper, faunal remains will be integrated with other classes of evidence to produce a multidimensional analysis of foodways and their role in social and political life at the site.

Grothaus, Mitchell (Morehead State University, The Craft Academy), Zebulon Hart (Morehead State University, The Craft Academy) and Timothy Hare (Morehead State University)

[9] *UAV-Based 3D Modeling of Excavations in Mayapán's Periphery*

During our 2015 and 2016 field seasons, we mapped and created 3D models of numerous excavation sites in the region surrounding Mayapán in the Northern Yucatán. Complete horizontal excavations of several rural house groups were conducted. We used unmanned aerial vehicles (UAVs/drones) to carry photographic equipment to collect both vertical and oblique photos as well as videos. The resulting images were processed in photogrammetric software to generate orthorectified airphoto mosaics and 3D models of each fieldwork location. These products were integrated into a Geographical Information System (GIS) to evaluate their accuracy and precision, and ultimately to facilitate analysis. In this poster, we outline the technology and data processing workflow used, display resulting 3D models, and report results of tests of product quality. The horizontally excavated sites include small groups of residential architecture in rural areas in Mayapán's periphery. The sites vary in size and types of architecture as well as status of preservation of features.

Grothaus, Mitchell [9] see Hart, Zebulon

Grover, Kevin [336] see Amundson, Leslie J.

Grube, Nikolai [179] see Volta, Beniamino

Gruhn, Ruth (University of Alberta)
[226] *Discussant*

Grund, Brigid (University of Wyoming)
[186] *Radiocarbon Dating of Technological Transitions: From Atlatl to Bow in Northwestern Subarctic Canada*

Prehistoric archaeologists traditionally focus on periods of stability rather than change when constructing regional cultural chronologies, even though explaining periods of change is equally if not more important than explaining periods of stability. The advent of large radiocarbon date databases and the proliferation of open-source computing programs such as program R have recently provided archaeologists with the tools necessary to begin understanding prehistoric transitions with high chronological precision. In this study, I employ Markov-Chain Monte Carlo procedures, Bayesian statistical theory, Program R, R's Bchron package, and IntCal13 to calculate the optimal number of dates required on atlatl and bow technology to adequately date this transition. Further analysis compares a subset of previously published radiocarbon dates on diagnostic atlatl and bow technologies collected from ice patches in the northwestern Canadian subarctic to thousands of runs of computer generated models in order to determine whether bow and atlatl technology overlapped for a significant amount of time in prehistory, and for how many years of actual calendric time they overlapped. Analyses such as this one open the door to explaining why and how technological transitions occurred within and between prehistoric groups.

G.S., Abhayan [167] see Vasantha, Rajesh

Gu, Wanfa [115] see Zhou, Yawei

Guanghui, Dong (Lanzhou University) and Fahu Chen (Lanzhou University)
[26] *Trans-Continental Cultural Exchange in Hexi Corridor, Northwest China during Bronze Age*

The Hexi Corridor of Northwest China was an important area for cultural exchange between west and east parts of the Eurasia during both historical and prehistoric times. Here we present new dataset of archaeobotanic, zooarchaeological and bone isotopic analysis, and radiocarbon dating from late Neolithic and Bronze sites in Hexi Corridor, and discuss the history of trans-continental cultural exchange in Hexi Corridor before Han Dynasty (202 BC–AD 220). Our results revealed the chronology of Neolithic and Bronze Age cultures, the accurate timing of the introduction of millet crops domestication in north China, and wheat and barley domesticated in west Asia, the transition of subsistence strategies, the impact of climate change on culture evolution, and human metal-smelting activities during Bronze period in Hexi Corridor. These works provide valuable insights to understand the pattern of prehistoric culture exchange across Eurasia in key region of the ancient Silk Road, and its impact on cultural development during that period.

Guapindaia, Vera [327] see Schmidt, Morgan

Guarino, Michael (University of Kansas)
[344] *Weaponry Standardization and the Potential for Sharing at the Agate Basin Site*

This study explores the potential for sharing of weaponry elements during communal hunts, and the implications of sharing pertaining to the overall technological organization of Agate Basin hunting groups. K-means cluster analysis was utilized to determine whether hafted-area morphologies on Agate Basin points were standardized and displayed properties consistent with expectations we might have if sharing of weaponry elements incorporated into the preparation for a communal hunt. I argue two standardized haft-area sizes are present in the complete Agate Basin point assemblage, and weaponry sharing could have been a reliable organizational technique employed by Paleoindian hunters during seasonal aggregations, serving to secure critical resources during a time when failure during a hunt would prove catastrophic.

Guderjan, Thomas Harold (University of Texas at Tyler), Sara Eshleman (University of Texas at Austin), Justin Telepak (Maya Research Program), Samantha Krause (University of Texas at Austin) and Timothy Beach (University of Texas at Austin)
[243] *Que Linda Vista! The First Glance at Lidar from Northwestern Belize*

In this paper, we offer a first look at the results of a lidar survey of northwestern Belize performed by the National Center for Aerial Laser Mapping in July, 2016. Three survey blocks were defined—one centered on the site of Xnoha near the Mexican border and another along the Rio Hondo corridor from near its headwaters to Chetumal Bay. The third and largest, covers the sites of La Milpa and Blue Creek as well as numerous ditched agricultural areas. At the time of submission, only the first was available to us and will be the focus of this discussion. In this 40 sq. mile area, we clarified the relationships among known sites such as Xnoha, Grey Fox and Nojol Nah. We also discovered two new plaza-pyramid complexes and enigmatic linear and rectangular features which may relate to land tenure in the Classic period.

Guderjan, Thomas Harold [243] see Krause, Samantha

Guedes, Carolina (MAE/USP)
[336] *3D Archaeology at MAE/USP (Brazil): Practices and Perspectives*

The use of digital photogrammetry and 3D scanning as tools for archaeological heritage record, analysis and dissemination has increased markedly in recent years. Using these technologies a post-doctoral project is currently in progress at the Museum of Archaeology and Ethnology (MAE) of São Paulo University, Brazil with the scope to document, record and analyze the animal stone figurines collection at the Museum. The objects are threefold: 1) to use photogrammetry and 3D scanner technologies to document the stone figurines collection from MAE; 2) to create a data bank available to researchers using the Sketchfab 3D platform and 3) to create a reference 3D printed collection for educational purposes to be used at Brazilian Universities. Here I will present the activities concerning the employed 3D techniques, the obtained results so far and perspectives for further researches.

Guengerich, Anna (Vanderbilt University)
[269] *Discussant*

Guengerich, Anna [230] see Cronin, Joseph

Guernsey, Brenda (University of Alberta) and Chelsey Geralda Armstrong (Simon Fraser University)

[176] *"We lived there for the food": Archaeologies of Dalk Gylakyaw, Home of the Gitsm'geelm (Kitsumkalum) Tsimshian*
The Gitsm'geelm are a galts'ap (community) of the Tsimshian Nation. Today, Kitsumkalum is located at the confluence of the Kalum and Skeena Rivers. There are a number of documented archaeology sites in the core territorial lands, down the Skeena River to the coast where Gitsm'geelm people hold various types of resource use sites. Dalk Gylakyaw (Robin Town), a large terraced village site replete with evidence of maintained gardens, orchards and distinct archaeological features, is located at the canyon on the Kalum River. A variety of external influences led to the eventual abandonment of Dalk Gylakyaw in the 1870s. Population loss and the introduction of a Western market economy, exacerbated by a devastating fire, led most of the community to move down the Skeena River to (primarily) Port Essington to engage in the fishing industry. Although a rich ethnographic history of the social and cultural importance of Dalk Gylakyaw to the Gitsm'geelm remains, little knowledge has been produced by the archaeology conducted since the 1940s. This paper reviews the range and scope of the more "classic" archaeological work conducted at this site from the mid-twentieth century, and will discuss the present "noninvasive" archaeology overseen by the community today.

Guernsey, Julia (University Of Texas at Austin) and Michael Love (California State University Northridge)

[391] *Hand-Modeled Preclassic Figurines and Early Expression of Concepts of Replication*
This paper concentrates on the vast corpus of hand modeled ceramic figurines from Preclassic Pacific slope of Mesoamerica, in particular those from Middle Preclassic La Blanca, Guatemala. We argue that, within this collection of figurines and related ones from elsewhere in Middle Preclassic Mesoamerica, one can find evidence for the concept of replication—or an emphasis on a recurring "type" or "character"—that predates the invention of the mold. Although Preclassic figurine assemblages are invariably marked by any number of unique examples that attest to the creative potential of these miniature objects, they are also characterized by recurring human characters whose "sameness" warrants consideration, especially with regard to questions of personhood, social identities, social norms, and concepts of destiny. While these Preclassic examples are not identical, nor produced en masse through a technology of replication, we argue that they do shed insight into the potential conceptual precursors for later technologies, especially those engaged in (re)production of the human form.

Guerra, Rafael [267] see Watkins, Tia B.

Guía-Ramírez, Andrea [181] see Ainis, Amira F.

Guilfoyle, David (Applied Archaeology International), Genevieve Carey (Applied Archaeology International), Raven Willoya-Williams (Kenaitze Indian Tribe), Michael Bernard (Kenaitze Indian Tribe) and Sherry Kime (United States Forest Service)

[394] *Empowering Tribal Youth in Cultural Heritage Management*
We examine a multiyear cultural heritage training program developed by Elders, youth and archaeologists in the Kenai Peninsula of Alaska. The program aims to embed cultural protocols and knowledge into methods of cultural heritage management (CHM). The program demonstrates the benefits of collaborative approaches that provide the foundation for more effective CHM, while at the same time providing direct social outcomes. We examine how this was established via a case study of one of the projects. The conclusion provides a brief assessment of how this model assists with the education of anthropologists and archaeologists toward a more culturally-embedded practice, and how the model is now being applied to a Cultural Resource Management (commercial) framework.

Guindon, Amelie (Université de Montréal)

[178] *Bonding Pots: Ceramics from the Midi Toulousain (Southwest France) and their Transatlantic Journeys to New France (Seventeenth–Eighteenth Centuries)*

The Midi Toulousain area shows a distinctive organization of its rural ceramic crafts during the early modern period. Three production centers made pottery, imitating each other's decorative styles and techniques. Distribution patterns are keys to understanding the social and economic factors that underlie regional competition in production and marketing. We believe that Midi Toulousain pottery production fits into the much larger socioeconomic sphere of the French Atlantic. This pottery was especially distributed downstream of the Garonne River toward the oceanic port of Bordeaux. Community of merchants as several New France Intendants who originated in the Garonne hinterland probably controlled ceramic exports across the Atlantic. Their networks may explain the transatlantic pottery trade from this region. Thereby, Midi Toulousain pottery in the colonial trade may be explained by the social nature of this trade. Through archaeometry aimed at determining provenance (ICP-MS/OES) we have examined ceramic diffusion paths along the Garonne River and toward New France in the seventeenth and eighteenth centuries. Our goal is to perceive social or familial trade networks within the supplying of French colonies using the example of Midi Toulousain pottery from Canadian sites. We will present results for the Fortress of Louisbourg and Place-Royale (Québec).

Guiry, Eric, Suzanne Needs-Howarth (Perca Zooarchaeological Research, Trent University), Paul Szpak (Department of Anthropology, Trent University) and Michael P. Richards (Department of Archaeology, Simon Fraser University)

[284] *Isotopic Analyses of Predatory Pelagic Fishes Show Significant Environmental Change in Lake Ontario Following European Settlement*
Isotopic analyses of archaeological faunal remains can add significant temporal depth to modern and historical baseline data, which play an important role in understanding present and future environmental change. In this paper, we use stable nitrogen isotope analyses of archaeological (AD 1000–1900) bone collagen of pelagic predators, such as lake trout (*Salvelinus namaycush*) and whitefishes (*Coregonus* sp.), as a proxy measure for environmental changes in Lake Ontario over time. Results show a significant enrichment in heavy ¹⁵N in the freshwater nitrogen cycle of Lake Ontario during the nineteenth century, likely linked to human-induced changes in the lake's nutrient and trophic structures. These findings provide a new baseline for modern ecological restoration work and give fresh insights into the broader environmental context for the impact of European settlement on the Great Lakes region.

Guiterman, Christopher (Tree-Ring Lab, University of Arizona)

[130] *The Origins of Chaco Timbers by Tree-Ring Based Sourcing*

The regional integration of Chaco Society includes the procurement of goods and materials from distant landscapes. Wood incorporated as roof beams, door and window lintels, and other building elements is no exception. Hundreds of thousands of trees were felled and hand-carried from mountain

ranges over 50 km from Chaco Canyon. Using tree-ring width patterns of beams compared to tree-ring chronologies from potential harvesting areas, we have begun to reconstruct the dynamics of timber procurement for the great houses. Our results corroborate previous efforts to source Chacoan beams by strontium isotope comparisons. Now, with hundreds of sourced beams, we show that prior to AD 1020, nearly all beams came from south of Chaco Canyon in the Zuni and San Mateo Mountains. At the onset of major great house construction in the eleventh century, timber began to arrive from the Chuska Mountains. By AD 1060, the Chuskas had eclipsed the southern areas in total wood importation. This shift coincides with a major influx of Chuskan pottery and Narbona Pass Chert, each unique to the Chuskas. Our results thus far demonstrate that the eleventh century florescence of Chaco culture was directly tied to, and supported by, outlier communities in the Chuska Mountains.

Gunchinsuren, B. [113] see Ciolek-Torello, Richard

Gunn, Joel D. [217] see Folan, William J.

Gunter, Madeline [161] see Norman, Neil

Guo, Jialong [113] see Peng, Fei

Guo, Wu (Institute of Archaeology, Chinese Academy of Social Sciences)

[26] *Land Rituals for Heaven: The Soft Cultural Power of an Early Nomadic Kingdom and the Begin of Silk Road*

Early nomadic kingdoms appeared during the early period of the first millennium BC. Those objects or art theme symbolized the ideology of the ruling class embodied on the prestige goods, the imperial kinsmen's cemetery, the large seasonal ritual center. The formation and expansion of the Aldy bel/Sandaohaizi culture reflected this process. Standing gold deer, curled up or standing snow leopard, the implements of the boar or patterns, and the conical gold earrings, widely spread with along the expansion. Kurgans of Arzhan Valley in Tuva in Russia is the imperial kinsmen's cemetery and the land of Sandaohaizi is the ritual center in summer. Those early nomads were likely to be Arimaspians in west historical text and Single Eye People in Chinese text. They were the key people to open the Silk Road in the Eurasian Steppes.

Gupta, Neha (Memorial University)

[167] *Fishers and Farmers in Northern Kerala: Preliminary Results from the Northern Kerala Archaeological Project (NorKAP)*

Conventional narratives of Indian history tend to focus on agricultural communities and have typically underestimated the role of fishing and fishers. With over 7,500 km of coastline along present day India, there is great potential for examining how fishing traditions changed and continued through time, and how they might have facilitated social complexification typically associated with agricultural communities. This paper will present preliminary survey results from the Northern Kerala Archaeological Project (NorKAP). Located between the Arabian Sea and the Western Ghats mountain range, the Bharathapuzha River Valley is characterized by slightly rolling uplands and plateaus that descend sometimes dramatically to the coastal plains. NorKAP's field survey begins to shed light on the changing relationship between coastal communities and those in the upland.

[372] *Discussant*

[167] *Chair*

Gupta, Neha [167] see Vasanth, Rajesh

Gupta-agarwal, Sonali (UCLA)

[240] *Keepers of Tradition, Harbingers of Change: Tracing Communities of Practice through Archaeological Ceramics*

Traditions are transmitted through teaching and learning. The manner in which knowledge relating to craft production gets transmitted can help us in understanding the causes behind cultural continuity and change. In this paper, I use an anthropological approach to discern teaching and learning patterns. I investigate the role of potters in modern-day pottery workshops of Egypt and India in the transmission of knowledge relating to pottery production. Employing video footage using a video annotation research tool, I discern subtle gestures and postures of potters engaged in the process of pottery production and statistically examine these to reveal patterns specific to each workshop. I transpose the method and understanding gained from the study of modern potters to the archaeological context in Karanis, Egypt. Teaching and learning of pottery making leaves recognizable markers on the vessel that can be traced metrically. My research suggests that one can trace ancient communities of practice, knowledge transfer and interpret continuity or change in material culture as part of an ongoing learning tradition.

Gurevitz, Anna (University of California, Merced) and Scotti Norman (Vanderbilt University)

[331] *A Wake of Change: Investigating Biocultural Interaction during the Early Colonial Period in the Central Andes, Peru*

Burial practice in the Central Andes was transmitted continuously from the Middle Horizon (AD 700–1000) onward, if not earlier in some areas, reflecting an agreed-upon understanding of Andean social identity throughout time. However, when the Spanish colonized the Andes, they drastically altered this continuity, forcing indigenous populations to bury their dead under the Church in idealized Catholic tradition. This sudden change in burial practice ruptured Andean identity as indigenous populations conformed, resisted or attempted to both maintain Andean identity while still act as good Catholics under Spanish control. At Iglesiachayoq (Ayacucho), an Inka settlement in the Chicha-Soras Valley of Peru, Andeans resisted this rupture of social identity through a subversive revitalization of traditional Andean landscape deities: a movement known as Taki Onqoy, (Quechua: Dancing Sickness). Using church burials excavated at Iglesiachayoq, we use mortuary and isotope analysis to address the question of changing social identities and the relationship between indigenous and imperial actors at the moment of contact. We find that participation in Taki Onqoy was likely fragmentary, and that church burials reflect both patterns of indigenous and Spanish cultural and religious tradition, indicating the negotiated and improvised nature of interaction and identity in the Early Colonial Period.

Gurt, Josep M. [356] see Angourakis, Andreas

Guurle, Arman, Emily A. Schach and Jane E. Buikstra

[231] *Of Mummies and Guinea Pigs: An Analysis of Burial Contexts at Chiribaya Alta*

In the Pre-Incan site of Chiribaya Alta, animals were often included in the graves of the deceased. Cuy, or Guinea pig, are among the most common type of animal found in these contexts, signaling the significance of these animals for the Chiribaya peoples in life and in death. Among traditional peoples in the Andes documented ethnohistorically and ethnographically, guinea pigs are consumed as food and are also used for divination and other religious practices. At Chiribaya Alta, a site in southern Peru near the city of Ilo, cuy have frequently been recovered from graves. This project explores the relationship between cuy and the Chiribaya beyond diet, as the frequent inclusion of cuy in graves at Chiribaya Alta suggest these animals possessed significant spiritual importance for Chiribaya peoples. Here, we use statistical analyses of burial goods to explore the significance of cuy to the Chiribaya people. These data allow us to infer the meaning of animal sacrifices to the Chiribaya and related views about death and identity. Thus, we use cuy to infer aspects of Chiribaya belief systems.

Gusar, Karla [282] see Zaro, Gregory

Gusev, Andrei [340] see Losey, Robert

Gusick, Amy (California State University, San Bernardino), Jillian Maloney (San Diego State University), Todd Braje (San Diego State University) and Jon Erlandson (University of Oregon)

[180] *Above and Below the Waves: Advances in the Search for a Late Pleistocene Colonization of California's Islands*

Methodological advances are reshaping our understanding of island colonization. Refinements in dating methods, paleoenvironmental reconstructions, and search techniques have resulted in discoveries that challenge outdated theories of islands as marginal to human migration, settlement, and subsistence. This is particularly true for research related to the initial peopling of the New World via a Pacific Coast route. Once considered irrelevant to the story of New World colonization, California's Northern Channel Islands have become a focal point in the search for evidence of Late Pleistocene migrations to North America. Integral to this search is identification of Pleistocene landforms that may harbor cultural material. Our search efforts have focused on the terrestrial and submerged portions of the island landscape that were intact and subaerial during the Late Pleistocene. By integrating paleoenvironmental reconstructions, archaeology, historical ecology, and terrestrial and marine geology, researchers are advancing methods that aid in understanding early island colonization and the search for the first Americans.

Gust, John

[280] *Comparing Labor Regimes: Debt Peons in the Northeastern Yucatán versus Free Laborers in British Honduras*

In this paper I compare the working conditions and cultural material found at a cluster of three sites in the northeast corner of the Mexican Yucatán Peninsula, to those at San Pedro Siris in the Cayo District of then British Honduras. The people in both areas contended with more militant Maya groups that were unhappy with improved relations with Mexican and British Honduran authorities respectively. Similar workplace dangers confronted both the lumber workers at San Pedro Siris and the sugar/rum workers in northeastern Yucatán. What was not shared by the two areas was how labor was organized. At the sites in the northeastern Yucatán, sugar/rum workers often had little to no land of their own, and it was common elsewhere in the Mexican Yucatán for laborers to accept becoming debt peons to gain access to farmland. The San Pedro Maya, including the inhabitants of San Pedro Siris, lived in free villages. They held, and jealously guarded, their own lands against interests of British logging companies. Thus, the sites in these two areas, the northeastern Yucatán and western British Honduras, provide a great opportunity for exploring similar groups of people with different levels of freedom to do as they chose.

Gust, John [280] see Mathews, Jennifer

Gustas, Robert (University of Alberta)

[336] *Least Cost Analysis of Maritime Movement in Prince Rupert Harbour during the Holocene and Late Pleistocene*

Spatial modeling of prehistoric maritime movement on the Pacific Northwest Coast is important in contemporary archaeology because it can help reveal previously unseen patterns and trends in movement through a landscape that has radically changed over time. GIS analysis has the potential to reveal new sites that have been hidden by changing sea levels. Here we present models of maritime movement using least cost path analysis (LCA) to determine the area's most likely to have been traveled through by the Tsimishian of Prince Rupert Harbour over the last 15,000 cal. yr BP. Using targeted origin points, high resolution lidar and bathymetry, new cost movement metrics, and more accurate sea level curves possible migration routes were derived for the Harbour. For time periods that lie within Prince Rupert Harbour's archaeological record calculated routes were systematically compared against known site locations to determine their predictive accuracy. Additionally, we provide estimations of where undiscovered sites from latter periods may exist within this environment. This work refines the application of LCA to seascapes and increases our ability to predict the location of submerged sites on the Northwest Coast, which is an important step in furthering our understanding of this area's human history.

Gutiérrez, Gerardo (University of Colorado at Boulder, Department of Anthropology)

[306] *Who Are the Olmec in Eastern Guerrero? From Graffiti to Monuments in the Caves of Guerrero*

The caves of Cauadzidziqui and Techan offer contrasting views of how Olmec style appears in eastern Guerrero. Cauadzidziqui presents large-scale paintings of individuals with Olmec style symbols and objects plastered over what is believed to be local late Archaic paintings—essentially graffiti placed in a sacred locale along a primary route between the highlands and coast. The Cave of the Governors presents three or possibly four jaguar sculptures carved out of living rock, flanking the interior opening to the cave. The cave opening offers a view of the rising sun on the summer solstice highlighting the cave's importance as conduit to the underworld and water mountain. Surrounding the cave opening were smaller niches recalling the cerro of Chalcatzingo and the origin of Chicomoztoc. This paper explores the significance of the iconography of these caves in eastern Guerrero and its relationship to broader Formative period iconography in Mesoamerica.

[306] *Chair*

Gutiérrez, Gerardo [306] see Sanders, Mariana

Gutiérrez-Roig, Mario [165] see Fernandez-Lopez de Pablo, Javier

Guttenberg, Richard and René L. Vellanoweth (California State University Los Angeles)

[336] Spatial Signatures of Ceremony and Social Interaction: GIS Exploratory Analysis and Spatial Modeling at Tule Creek Village (CA-SNI-25), San Nicolas Island, California

The spatial patterning of artifacts and features excavated from the Tule Creek site (CA-SNI-25), San Nicolas Island, provides an opportunity to analyze the intrasite correlations between artifact types, materials, and features. Excavations at East Locus at CA-SNI-25 have yielded evidence of trade with other islands as well as evidence suggesting complex ceremonial activity, such as dog and bird burials, large hearths, stacked stone features, and multiple discrete pits. Here we use GIS exploratory analysis to examine the intrasite spatial distributions of artifact types and materials in context with ceremonial features. The clustering of artifact and material types are evaluated using spatial autocorrelation and hot-spot analysis. Our analysis includes circular and j-shaped shell fishhooks, sandstone saw abraders, local and extra-local lithic debitage, red ochre, quartz and calcite crystals, and chipped and ground stone tools of exotic toolstone. We utilize GIS exploratory methods to isolate distributions of formal artifacts and features, and to examine the organization of space in both ceremonial and utilitarian contexts. Ultimately, spatial analysis using intrasite GIS reveals possible linkages of artifacts, as well as patterns of spatial and temporal variability in technology, subsistence, and behavior at a village on San Nicolas just prior to European contact.

Guzman, Benito ((NAU) Northern Arizona University)

[89] Mapping Prehistoric Behavior Patterns at Lithic Toolstone Source in the Colorado Desert

This pilot study examines lithic artifact scatters recorded in the Colorado Desert of California. The dataset used in this research was compiled from several Cultural Resource Management (CRM) projects that have taken place in the study area. Tierra Environmental Services of San Diego collected large portions of data located on cobblestone terraces in Imperial County, California between 2011 and 2013 (smaller sections have been recorded by various environmental consulting firms since the mid-1930s). Research goals include: understanding prehistoric settlement, mobility, and subsistence practices on the cobblestone terraces that rest a short distance from the Western margin of prehistoric Lake Cahuilla. The study will develop inferences regarding behavior through the geospatial mapping of lithic reduction locations. In addition, least cost path analysis is applied (through Geographic Information Systems) to examine the most efficient travel paths within the environment. Optimal foraging theory supports the use of analysis of least cost travel paths in the distributions of lithic reduction, as such events are predicted when examining small-scale societies and their focus on procurement of the least costly lithic resources. Cost, in this study, is determined and assessed based on energy expenditure and potential routes to quarry sites.

Guzzo Falci, Catarina (Leiden University), Annelou van Gijn (Leiden University) and Corinne L. Hofman (Leiden University)

[379] From Beads to Biographies: A Microwear Study of Late Precolonial Ornaments from the Dominican Republic

Bodily ornaments are found throughout the Greater Antilles and have been generally regarded as items belonging to high-status individuals. Many studies have focused on their iconographic designs, meaning, and exchange among so-called Taíno societies (AD 1200–1500). However, much of the biography of stone and shell ornaments is poorly known, as raw materials, technologies of production, systems of attachment, and modes of deposition have not received comparable attention. This is partially because only recently such artifacts have been recovered from secure archaeological contexts. The present paper focuses on the biography of ornaments, as part of a larger research project that aims to generate a more dynamic and plural picture of the societies that occupied the Dominican Republic during the colonial encounter. Emphasis is given to the site of El Flaco in the northwestern region where almost 200 ornaments were found. Each ornament is studied through microwear analysis, in order to reconstruct its production sequence and use life. Raw material availability and properties, as well as contexts of deposition are also taken into account. The systematic study of ornaments from recently excavated sites will generate for the first time an understanding of how these objects operated within and also between different settlements.

Gyucha, Attila [178] see Yerkes, Richard

Haaland, Magnus (University of Bergen, Norway), Christopher Miller (University of Tübingen, Germany) and Christopher Henshilwood (University of Bergen, Norway and University of the W)

[354] Investigating Site Formation Processes in Blombos Cave, South-Africa: A Geoarchaeological and Micro-Contextual Approach

Archaeological material, for example engraved ochre and bone, shell beads, bone tools, and bifacial points recovered from the Middle Stone Age levels (c. 101–70 ka BP) at Blombos Cave (BBC), South Africa, is central to our current understanding of the technological and cultural development of early modern humans in southern Africa during the Late Pleistocene. While these artifacts have attracted much attention for their behavioral implications, the sedimentary context in which they were recovered has not yet been studied in detail. Here we present the results of a micro-contextual approach to the BBC cave deposits, including a geoarchaeological study of the complete sedimentary sequence of the site. We've applied and combined a range of methods during both field work (photogrammetry and micromorphological sampling) and laboratory analysis (FTIR, micro-FTIR, micro-GIS, and optical petrology). Our geoarchaeological investigation of BBC enables us for the first time to identify and interpret the major site formation processes responsible for the accumulation of anthropogenic and geogenic deposit within this important cave site. It also enables us to investigate human aspects of the BBC context that hitherto have been overlooked, such as overall site structure, intrasite spatial variability, prehistoric pyrogenic activity, and site modification and maintenance.

Haap, Wolfgang [203] see Krause, Johannes

Haas, Jennifer

[336] Integrating Site Formation Processes, Spatial Analysis, and Local Statistics to Assess Archaeological Site Structure: A Case Study from a Multicomponent Site in the Western Great Lakes

This paper presents a method to delineate discrete temporal occupations at open-air multicomponent sites by integrating site formation processes, spatial analysis, and local statistics. Open-air multicomponent sites, formed on stable surfaces but lacking strong vertical integrity, pose many challenges for the delineation and interpretation of temporally discrete occupations. Such sites often lack vertical stratigraphy, so defining the horizontal spatial structure of components represents a critical first step in analysis and a prerequisite for further interpretation. The case study reviewed here focuses on the Finch site (47JE902) in southeastern Wisconsin. Finch harbors prehistoric occupations that span circa 8300 BC to AD 1400. Recent excavations generated over 200,000 artifacts and a high density of in situ cultural features including living floors, hearths, and cooking, processing, and refuse pits. Site formation processes are used to determine temporally sensitive factors such as the origination depth of cultural features. A GIS-aided analysis using descriptive statistics and kernel density maps are used to explore the patterning of diagnostic material culture and guide the selection of weighting measures for the local statistics. Local statistics are then used to delineate areas within the site that are the focus of activities associated with each cultural-temporal component.

Haas, Randy (University of Wyoming)

[286] The Signaling and Inheritance of Cooperation: Artificial Cranial Modification among Altiplano Foragers

We report on the recent archaeological discovery of a 7,000-year-old population of hunter-gatherer burials and discuss the key insights they offer into how hunter-gatherer societies may have maintained cooperative structure against evolutionary odds. Sixteen human burials interred at the site of Soro Mik'aya Patjxa in the Andean Altiplano of Peru consistently exhibit intentional artificial cranial modification (ACM)—the irreversible shaping of human crania during infancy. Our analysis of cranial form, burial context, and skeletal properties indicates that the ACM existed among a relatively egalitarian hunter-gatherer population and cannot be linked to hierarchical social structure. These observations in conjunction with fundamental properties of ACM—its unfakability, visibility, and vertical inheritance—suggest that ACM served as an honest visual index of an individual's enculturation including their understanding of moral codes that mitigated the inherent risks of non-kin cooperation. Groups that engaged in ACM would have enjoyed competitive advantages over those that did not, and offspring who received ACM from their parents would have inherited those group advantages. The entailed mechanism of kin and non-kin cooperation helps resolve the question of how a seemingly trivial form of human body modification persisted for more than seven millennia and radiated throughout South America.

[286] *Chair*

Haas, Randy [186] see Surovell, Todd

Habicht-Mauche, Judith [155] see Eckert, Suzanne

Habiaremye, Cedric (Washington State University, Dept. Crop and Soil Sciences), Jade d'Alpoim Guedes (Department of Anthropology, College of Arts and Sc) and Kevin Murphy (Department of Crop and Soil Sciences, College of A)

[177] *Ancient Crops, Modern Possibilities: A Study on the Potential for Millet Agriculture in the United States*

Millet is among the world's oldest crops. Unique characteristics such as their adaptation to high temperatures, drought conditions, marginal environments and low-input farming systems, make millets promising rotational in diverse agro-environments across the United States. Millets could play a vital role in the diversification of cropping systems and provides a regionally available source of highly nutritious cereal grain. Despite being a very early domesticated cereal crop, and a major food source in East Asia, South Asia, and Africa, millets now play a relatively minor role in most human diets and agricultural systems. In order to fully examine their potential role as alternative crops in the United States, new and expanded research is needed in the fields of millet agronomy, breeding, nutrition, and food science. This paper presents the archaeological background of millet domestication and spread as well as lessons learned from field and greenhouse trials. Crop niche models evaluate how millets could be adaptive in the arid regions across the United States.

Hackenberger, Steven (Central Washington University, Department of Anthr), Douglas MacFarland (CHM2H) and James Brown (Washington State University)

[343] *Magnetic Susceptibility of Soils: Tephra, Erosion, and Fire on Columbia Plateau Landscapes*

Sedimentation and soil formation on uplands of the Columbia Plateau are strongly influenced by climate, tephra, erosion of arid lands, and fire regimes. Magnetic susceptibility of in situ strata, and laboratory samples from arroyo profiles of the Yakima Upland Fold Belt can help untangle the interactions of these processes in shaping natural and cultural landscapes. Records from four profiles of overlapping age (500–9000 BP) are compared. Data for mass specific magnetic susceptibility are cross-evaluated between these four sites. The graphed results are compared for profiles with and without artifact bearing cultural strata. Several working hypotheses are outlined. High magnetism in these profiles appears to correspond with Mazama tephra and erosion during the arid post glacial maximum (8000–4000 BP). However, magnetism also peaks in buried A horizons during moist intervals (4000–3000 BP). Some of these signatures can be attributed to the presence of Mount St. Helens tephra, and/or burn layers as a result of natural and cultural fire episodes related to Native American management of sage-grass steppe communities.

Hackenberger, Steven [86] see Brown, James

Hacker, Stephanie (University of Tennessee), Beatrix Arendt (Department of Archaeology, Thomas Jefferson Founda), Derek Wheeler (Department of Archaeology, Thomas Jefferson Founda) and John G. Jones (Archaeological Consulting Services)

[365] *Plant Analysis of an Eighteenth-Century Slave Quarter: Incorporating Macrobotanical and Pollen Analysis at Monticello to Improve our Understanding of Enslaved African-American Lifeways*

This research emphasizes the value of studying plant remains recovered from archaeological contexts while contributing to our understanding of the lifeways of enslaved African-Americans from late eighteenth-century Virginia. The primary objective of this research is to identify plants selected by enslaved field laborers living on the Home Farm Quarter of Thomas Jefferson's Monticello plantation. This study incorporates both macrobotanical and pollen analysis and presents a wide variety of useful plant species uncovered from the subfloor pits found at Site 8, one of the housing quarters for enslaved field laborers. These results expand our understanding of the methods employed by the occupants of Site 8 to improve their conditions. Additionally, this research addresses how Monticello's agricultural shift from tobacco to wheat production altered subsistence strategies of enslaved field laborers over time. The botanical data reveal that the enslaved occupants of Site 8 actively improved their circumstances by producing domesticated plants in nearby gardens and procuring wild plant species by traveling across the Monticello landscape.

Hadden, Carla (Center for Applied Isotope Studies, UGA)

[254] *Discussant*

Haddow, Scott (University of Bordeaux)

[73] *(Re)new(ed) Perspectives on Mortuary Practices at Neolithic Çatalhöyük*

At Çatalhöyük, as elsewhere in the Neolithic Near East, there is an emphasis on the manipulation and redistribution of human body parts, with particular attention paid to the skull. Evidence for this practice occurs with the observation of 'headless' primary burials and the secondary redeposition of disarticulated crania and mandibles within primary and secondary burial contexts. The manner in which these practices were carried out and the motivations for such behavior have been the subject of much debate since the site was first excavated in the 1960s. In recent years, our understanding of the mortuary customs practiced by the Neolithic inhabitants of Çatalhöyük has changed considerably, largely as a result of new insights and new personnel, but also by revisiting previously discounted interpretations which had long been ignored. As the Çatalhöyük Research Project nears the end of its 25 year remit, I will discuss the most recent interpretations of the mortuary practices, while also providing a critical appraisal of the ways in which these interpretations have evolved over the years.

Hadley, Dawn (University of Sheffield), Elizabeth Craig-Atkins (University of Sheffield) and Jennifer Crangle (University of Sheffield)
[139] *The Afterlife of the Charnel Chapel at Rothwell (Northamptonshire, UK)*

The practice of channelling human remains has recently been revealed to have been widespread in medieval England, with chapels specially built for this purpose. However, this practice ceased at the time of the early sixteenth-century Protestant Reformation, and the charnel chapels were emptied and in some cases demolished. A rare exception is at Rothwell (Northamptonshire, UK), which survived the Reformation intact, apparently because it was closed up at this time with the charnel in situ. The chapel was rediscovered in the early eighteenth century, by a—presumably shocked—grave digger, who fell into it! By this time, charnel chapels no longer had any formal liturgical function, but the site became a place of local fascination and folklore, recounted by antiquarians and reflected in graffiti scratched on to the walls of the chapel. New radiocarbon dating evidence, reveals that some human remains were added to the chapel in the eighteenth and nineteenth centuries, possibly medical specimens. This paper explores the post-medieval history of the Rothwell charnel chapel, and examines the interactions of the local community with the chapel and the human remains it contained, to throw new light on how a fundamentally medieval practice was appropriated in later periods.

Hadley, Dawn [139] see Craig-Atkins, Elizabeth

Hageman, Jon (Northeastern Illinois U) and David Goldstein (National Park Service)
[388] *From Quelites to Crop Indices: Thinking Through Maya Chenopods*

While chenopod cultivation has been documented extensively in North and South America, evidence for similar practices in the Maya area is lacking. Macrobotanical evidence of *Chenopodium* recovered from prehispanic Maya archaeological sites is limited to a few seeds. In contrast, the palynological record minimally suggests widespread tolerance across the entirety of the Maya area, if not intensive management or in some contexts even cultivation of *Cheno-am* genera. It is likely that chenopods were an integral part of the successional agroecology of fallowing and milpa agriculture. Typically, archaeologists consider such data as evidence of food production, but our work in documenting the ubiquity and uses of plant among ethnographic Maya populations strongly suggests that the primary use of chenopods among the Maya is as a source of medicine and greens.

Hageman, Jon [388] see Goldstein, David

Haggard, Alyssa (University of Calgary), Jeffrey Brewer (University of Cincinnati) and Meaghan Peuramaki-Brown (Athabasca University)
[337] *Investigations of Peri-Urban Settlement and Domestic Reservoirs: Research from Yaxnohcah, Campeche, Mexico*

Peri-urban zones of settlement are unique localities among the urban-rural continuum that form due to dispersed urban growth, creating hybrid landscapes of fragmented urban and rural characteristics. Within these zones, domestic-scale reservoirs that the ancient Maya modified and maintained to manage their seasonally-scarce water resources are an important component. This study focuses on processes of multiple nuclei urban development and associated peri-urban formation at the site of Yaxnohcah in southern Campeche, Mexico, with particular emphasis on the collaborative research on residential and small water reservoirs situated between the Alba and Fidelia complex groups. Yaxnohcah is located in the middle of the Central Karstic Uplands, a region in the Yucatán Peninsula known for its large, early urban centers. The extended period of occupation at the site (c. 1000 BCE–850 CE) combined with a distinct, dispersed, multiple nuclei settlement pattern provide an excellent opportunity to investigate questions concerning early urban development and its dynamic connections to local environmental and integrative processes. Our research to-date (2011–) adopts both higher and lower scale approaches—using lidar-derived imagery and investigating massive platforms, smaller urban house lots, and household tanks—to advance our awareness of early urban development in this area of the central Maya lowlands.

Haines, Helen (Trent University) and Kerry Sagebiel (Northern Illinois University)
[3] *"What's in a Name?" Questioning the Idea of Olmec Origins for Jade Spoons*

Jade has been long recognized by archaeologists as an important trade item among ancient Mesoamerican cultures. This is particularly true for ancient Olmec and Maya cultures where it also is seen as an indicator of social status. Unfortunately, the precocious development of Olmec society, lead many early archaeologists to an over-emphasis of Olmec influence on the Maya during the Formative Period (ca. 1000–400 BC). This is particularly noteworthy in the attribution of jade "spoons" to the Olmec, despite the lack of archaeological evidence. This paper focuses on the discovery of a jade spoon excavated at Ka'kabish, an ancient Maya site in North-Central Belize. This is one of two spoons recovered from a secure archaeological context and as such it helps further our understanding of the use and history of these objects. Based on this discovery, coupled with the limited number of other spoons that can be linked to a known site, this paper argues that these pieces should not be unquestionably attributed to the Olmec.

Haines, Helen [321] see Sagebiel, Kerry

Hairr, John
[378] *Native American Whaling and Porpoise Hunting Techniques along the East Coast of North America*

Native Americans were the first people to exploit the cetacean fauna found in the coastal waters of the western North Atlantic. Most of these animals were drift whales found washed up along the shoreline, but there is historiographical evidence indicating that some Native Americans actively pursued whales, porpoises and dolphins from small craft offshore. In this paper I discuss various tools and techniques utilized by the indigenous inhabitants of North America to pursue, harvest and process whales in the Atlantic, examining early accounts from the coast of Florida north through the Carolinas to New England and the Canadian Maritimes. I also discuss the results of experiments made with my colleagues at the North Carolina Maritime Museum in Beaufort replicating the process of oil extraction from odontocete blubber as well as porpoise jaw oil.

Haisley, Christopher (University of Utah), Ashley Parker (University of Utah), Christopher Parker (University of Utah) and Brian Coddington (University of Utah)
[193] *To Guard or Not to Guard? Variations in Territoriality within Hunter-Gatherer Societies*

Variation in territory size, population density, and residential mobility among small scale hunting and gathering societies tends to co-vary with territorial behaviors. Specifically, groups living in larger areas, at lower population densities with higher mobility are less likely to exhibit territorial behavior than their counterparts in smaller areas. Based on models from behavioral ecology, we suggest that this variation is due to underlying levels of environmental productivity: where productivity is high, resources are abundant, allowing for dense populations that do not need to move as much, which creates smaller territories that can be defended. Here we compile and evaluate a global dataset of ethnographic and ethnohistoric hunter-gatherers linked to remotely sensed data on environmental productivity to test this hypothesis.

Halcrow, Siân [30] see King, Charlotte

Halcrow, Siân [276] see Newton, Jennifer

Hale, Thomas [191] see Lubinski, Patrick

Halfmann, Carrin [252] see Sattler, Robert

Halim, Hamima [196] see Cerquera Benjumea, Gustavo

Hall, Kate (Texas Tech University), Samantha Mitchell (Texas Tech University) and Patrick Lewis (Sam Houston State University)
[365] *An Application of Geospatial Technology to the Collection and Analysis of Human Skeletal Remains*

Documenting the spatial distribution of scattered and commingled skeletal elements is an important aspect of forensic anthropology and bioarchaeology. While existing methods of documentation may effectively represent scattered and commingled human skeletal remains, they do not facilitate further spatial analysis that may be useful in reconstructing taphonomic processes. Geographic Information Systems (GIS) have recently been leveraged as a method of inventorying human remains, but their capacity for detailed spatial analysis is underutilized. In the spring of 2016, graduate students from Texas Tech University explored GIS as a tool for the documentation and analysis of human skeletal remains. The remains of eight individuals—previously deposited at the Southeast Texas Applied Forensic Science facility within a 15 m² area over a four-year period—were mapped in situ with a Total Data Station. Geospatial analyses were then performed in ArcGIS to assess patterns in the spatial distribution of remains. This paper presents a comprehensive method for the efficient mapping of human remains using GIS and details potential uses of geospatial software in the reconstruction of taphonomic events. It further discusses the benefits and shortcomings of a geospatial method of documentation and analysis in forensic anthropology and bioarchaeology.

Hall, Zachary [7] see McDonough, Heather

Haller Von Hallerstein, Sophia (Institute for Archaeological Sciences, Paleoanthropology, Universität Tübingen), Dorothée Drucker (Department of Geosciences, Biogeology, Universität), Katerina Harvati (Senckenberg Center for Human Evolution and Paleoecology) and Kurt Rademaker (Department of Anthropology, Northern Illinois University)

[143] *Diet and Adaptations in a High-Altitude Rockshelter of Southern Peru, Based on Stable Carbon and Nitrogen Isotopes*

We present the results of stable carbon and nitrogen isotope analyses made on well-preserved collagen of four Early and one Middle Holocene adult humans together with coeval faunal remains of Cuncacha rockshelter in the Peruvian puna to determine paleodiet. In addition, we reconstruct important aspects of the ecology of the Pucuncho Basin, in which Cuncacha is located, using new as well as already available and secured values for stable carbon and nitrogen of archaeological and modern fauna and plants. This work addresses issues of aridity and altitude in paleodietary reconstructions and contributes to the development of ecological models for the interpretation of archaeological remains in the high altitude and arid Andes. Comparing archaeological and modern material offers higher resolution on chronological variation of the productivity of the basin. The results for paleoecology confirm the presence of a distinct local signal, and the results for human collagen indicate a consumption of protein from local animal and plant resources. As one of the oldest archaeological sites in South America, the apparent prolonged occupation of Cuncacha has significance for early Paleoindian settlement strategies and resource exploitation as behavioral adaptations to puna ecosystems, and thus for the onset of adaptations to high altitude.

Halliday, Jennifer

[258] *Assessing Age Related Changes in the Strength of Relationship for Dental, Skeletal, and Chronological Age using Bivariate Correlations*
This study examines the changes in the strength of relationship between dental and skeletal ages against chronological age in a sample of known sex and age skeletons using bivariate correlations and linear regression models. The sample is selected from the *Electronic Encyclopedia on Maxillo-Facial, Dental, and Skeletal Development* by Dr. Arto Demirjian, and consists of 483 observations from 78 individuals aged 6 to 19 years. The results indicate that while dental maturity has a stronger correlation with chronological age in younger individuals, as they get older this strength decreases and the relationship between skeletal maturity and chronological age gets stronger.

Halligan, Jessi (Florida State University)

[226] *Pre-Clovis Archaeology in the Frontiers of Research: Page-Ladson and the Importance of Submerged Sites to Understanding the First Americans*

Dr. Gruhn has spent her career working in locations that most Paleoindian archaeologists consider to be inaccessible and difficult, maintaining that the story of the First Americans can best be found in well-preserved localities on the geographical and chronological frontiers. Our recent work at the Page-Ladson site in Florida fits well within the spirit of her investigations. Page-Ladson is an inundated terrestrial site with sediments containing lithic artifacts associated with a butchered mastodon radiocarbon dated to 14,450 years ago. Page-Ladson is more than a thousand years older than Clovis, and demonstrates that people were in the Southeast well before the opening of the ice-free corridor, providing indirect support for coastal colonization models. Further, this submerged cultural component is buried within a well-preserved Late Pleistocene-Early Holocene geological sequence spanning the period from 16,000–8,500 years ago that has provided proxy evidence for major climatic changes and the extinction of megafauna in the Southeast.

[6] *Discussant*

Halligan, Jessi [81] see Carlson, David

Hallson, Jennifer [339] see Lakevold, Courtney

Halperin, Christina (Université de Montréal)

[391] *Profane Illuminations: Molded Maya Figurines in Comparative Context*

In many ways, simple molded Maya figurines during the Late Classic period become ordinary objects, aided in part by the technological capability of reproduction through molds. Nonetheless, molds do not automatically create ordinary, accessible, everyday objects, and, in turn, ordinary objects are not without their ability to delight and affect the senses. This paper draws on newly collected ceramic production evidence from the site of Ucanal, Guatemala, as well as a compilation of research on figurines from elsewhere in Petén, Guatemala, to explore the technological, spiritual, and sensual aspects of ceramic figurines. In comparing molded figurines from the Late/Terminal Classic period with figurines from the Preclassic and Postclassic periods, the paper explores how the value of mold technologies—and concepts of the ordinary—change over the *longue durée*.

Halperin, Christina [209] see Leight, Megan

Halstad McGuire, Erin (Department of Anthropology, University of Victoria)
[263] *Chair*

Hambly, Joanna (University of St Andrews)
[1] *Discussant*

Hambly, Joanna [224] see Dawson, Tom

Hamilton, Derek (Scottish Universities Environmental Research Centre)

[81] *The Dating Game: The Dialogue between Absolute and Relative Techniques in the British Iron Age*

The traditional approach to the Iron Age (c. 800 cal BC–cal AD 43) has been to construct complex chronologies based on artifact typologies. Historically, radiocarbon dating was eschewed in this period, because it was thought to offer less precision than artifact dating. Such views are becoming increasingly untenable, and recent Iron Age research is showing that typological dating produces sequences that are regularly too late. This paper will draw upon British Iron Age research from across the last decade to explore how chronologies based in scientific-dating and developed within a Bayesian framework can allow us to explore events and investigate processes. Furthermore, it will argue that by maintaining an open dialogue with the 'traditional' dating techniques, it often is possible to come to a reconciliation and thus new forms of understanding.

[254] *Moderator*

Hamilton, Derek [81] see Lohse, Jon

Hamilton, Derek [144] see Sayle, Kerry

Hamilton, Marian (University of New Mexico), Lee Drake (University of New Mexico), Wirt Wills (University of New Mexico) and Emily Lena Jones (University of New Mexico)

[130] *Stable Isotope Ratios from Modern and Archaeological Fauna from Chaco Canyon, New Mexico*

Stable isotope analysis of archaeological material can reveal aspects of diet, mobility, resource exchange, and social structure in ancient civilizations. Chaco Canyon, New Mexico is a World Heritage site in northwestern New Mexico with peak activity and habitation around AD 1000. The nature of resource management by those inhabiting the Canyon has been long debated. Here, we present carbon, oxygen, nitrogen, and strontium isotope data from archaeological faunal remains collected from multiple time intervals throughout the habitation of Chaco Canyon. We also include a robust comparable dataset of modern fauna from the same region to provide context and quantify expected isotopic variation under known parameters. We use these isotopic systems to test hypotheses regarding long-distance animal resource procurement, small mammal domestication, and shifting ecological niches of nondomesticated fauna as human activity intensified. We also discuss limitations in the application of isotopic data to such questions and suggest methodologies to accurately quantify variation and uncertainty when using this type of data.

Hamilton, Marcus (University of Missouri) and Robert Walker (University of Missouri)

[277] *Population-Area Scaling in Contacted and Uncontacted Amazonian Indigenous Groups*

Sublinear population-area scaling relations have been documented across a range of human societies, from hunter-gatherers to both ancient and modern cities. As such, these scaling patterns seem to capture a common statistical feature of human spatial ecology. In this talk we examine the spatial ecology of both recently-contacted and uncontacted groups in the Amazon Basin. Using a combination of census data, government estimates and imagery we find sublinear scaling between the size of villages and their populations in both contacted and uncontacted groups. We discuss these results and show how scaling-based research may be useful in assessing the demographic health of uncontacted populations and their future viability.

Hammer, Ben (PaleoWest Archaeology), James Potter (PaleoWest Archaeology), Terry Knight (Ute Mountain Ute Tribe) and Lynn Hartman (Ute Mountain Ute Tribe)

[366] *West Mancos Survey and Site Preservation Project, Southwest Colorado*

The Ute Mountain Reservation in the Four Corners region of the American Southwest contains some of the most spectacular and numerous prehistoric archaeological sites containing standing architecture in the country. Combining research and preservation efforts at these sites is a priority of the Ute Mountain Ute Tribal Historic Preservation Office. The West Mancos Project focused on three sites along the Mancos River containing the remnants of circular towers. Preservation and research efforts consisted of site recording and mapping, infield pottery analysis to acquire dates of occupation, GIS analysis, and conducting photogrammetry both from pole-mounted cameras and unmanned aerial vehicles (UAVs). The results include a greater understanding of the chronology and function of these sites, 3D models of the standing architecture, and broader contextualization within an extensive cultural landscape.

Hammer, Emily (University of Chicago) and Dan Lawrence (Durham University)

[118] *Sites, Landscapes, and Survey Intensity in the South Caucasus: the Evolution of Landscape Archaeology Approaches in Armenia, Azerbaijan, and Georgia*

In the last decade, the number of landscape archaeology projects in South Caucasia has dramatically increased. South Caucasia geographically and disciplinarily sits between two early centers of survey archaeology (Near East and Mediterranean), each with its own methodologies and primary

questions. The mountainous landscapes of South Caucasia, the high degree of population mobility in many periods, and the extent of Soviet land engineering challenge archaeologists to develop hybrid survey strategies, new definitions of “sites,” and new satellite imagery interpretation methods, as well as to question conventional ways of interregional settlement data comparison. This paper illustrates several promising approaches carrying landscape archaeology forward in the region.

[325] *Discussant*

Hammer, Emily [151] see Kristy, Gwendolyn

Hammerstedt, Scott (University of Oklahoma), Jami Lockhart (Arkansas Archeological Survey), Amanda Regnier (University of Oklahoma), George Sabo (Arkansas Archeological Survey) and John Samuelson (Arkansas Archeological Survey)

[87] *GPR Survey of the Brown Mound at Spiro*

This poster presents the results of GPR survey at the Brown Mound, an earthen platform mound at the Spiro site in eastern Oklahoma. The mound was targeted by looters in the 1930s and was subsequently tested in the 1930s and 1980s by professional archaeologists. However, Brown Mound remains poorly understood because, for the most part, these excavations did not extend deeply enough to provide good information on mound stratigraphy or internal features. Our survey obtained nearly 100% coverage of the remaining mound and the results, along with previous geophysical surveys, allow us to paint a more complete picture of Spiro.

Hammond, Joanne (Pacific Heritage Research)

[17] *How to Enact Reconciliation in British Columbia CRM*

Righting the balance between Indigenous and non-Indigenous populations is the defining challenge of twenty-first century nationhood in Canada. Archaeology, as a discipline and an industry, has specific responsibilities and opportunities in this reconciliation. Despite recent attention brought to the social injustices of colonization, reconciliation is still scantily considered and spottily applied by heritage practitioners, governments and businesses. I discuss how we can and must enact reconciliation in the heritage resource management industry in BC, and consider its actual and potential effects on the practice of archaeology in general and CRM in particular. I set the challenges of decolonizing BC CRM in wider legal, political, and economic contexts, including how archaeology interacts with case law big and small, treaty processes, UNDRIP, the work of the Truth and Reconciliation Commission of Canada, and evolving government-to-government relationships. I propose a “republic of archaeology” as unifying philosophy through which reconciliation can be pursued through specific kinds of engagements with the primary constituencies of CRM: Indigenous groups, professional practitioners, regulatory bodies and the non-Indigenous public. I suggest concrete steps we can take as individuals and organizations to support reconciliation, and evaluate some of the potential barriers to this shift in heritage practice.

Hammond, Norman (Department of Archaeology, Boston University)

[67] *Discussant*

Hampson, Jamie (University of Western Australia)

[28] *Embodied Rock Art Motifs in Far West Texas and Northern South Africa*

In this paper, I consider embodied rock art motifs in two rock art regions: far west Texas and northern South Africa. By employing the tools of embodiment theory, certain motifs in both regions can usefully be seen as expressions of how indigenous ontologies were perceived, how things were, and how identities were tied to physical beings and manifestations of physical beings. As with research on ritualistic ontologies and the process of making rock art, embodiment theory can help us overcome the tendency in rock art studies to treat the original image-makers as reactive viewers of their own handiwork. A key point is that, once created, pictographs and petroglyphs are symbolic manifestations and powerful things in themselves; they are not mere ‘reflections’ of either natural or supernatural phenomena.

[28] *Chair*

Hampton, Ashley (University of Montana), Anna Marie Prentiss (Department of Anthropology, University of Montana) and Thomas A. Foor (Department of Anthropology, University of Montana)

[286] *The Evolution of Cooperative Labor within a Long-Lived Housepit at the Bridge River site in British Columbia*

At the Bridge River site, British Columbia, evidence for intra-household cooperation appears to center within a time of village growth during late Bridge River 2 (ca. 1500–1300 cal. BP) before collapsing into familial-based competitive behavior during Bridge River 3 (ca. 1300–1100 cal. BP). This shift from cooperation to competition occurs in tandem with a rise in inequality as the community experienced a Malthusian ceiling. Building on previous multivariate statistical approaches, further analysis of the association of household-based cooperative labor and variation in activity areas is performed. This analysis focuses on teasing out shifting patterns of cooperation over time along with subtle changes in gendered work that such patterns may belie. Excavations at Housepit 54 have uncovered a series of 17 anthropogenic floors. By examining this household floor-sequence, we can interrogate the underlying factors that function to reinforce or negate cooperative social interaction. Keeping in mind that such “micro-interactions” are also reflective of individualized embodiments of socially understood distinctions (sex, age, kinship) a more thorough understanding of past social lives is revealed. Through such analysis we provide more nuanced interpretations of cooperative labor patterns within the Mid-Fraser region and highlight the potential of quantitative and qualitative methodologies in household archaeology.

Hampton, Ashley [50] see Nowell, Sarah

Han, Tao, Wenxin Zhang (Department of Archaeology, Jilin University), Xingyu Man Man (Department of Archaeology, Jilin University), Anqi Wang (Department of Archaeology, Jilin University) and Xiaofang Gao (Department of Archaeology, Jilin University)

[115] *Dental Microwear Analysis and Diets of Dacaozi Ancient Population in Qinghai, China*

Dental microwear analysis (DMA) focuses on the microscopic scratches and pits that formed on a tooth’s surface as the result of chewing which is a useful approach to reconstruct the diets of animal species and human ancestors. The aim of this study is to use this new method to reconstruct the diets of the Dacaozi ancient population, whom lived in the ancient interactive region of agricultural and nomadic economy in Qinghai Province, northwest China. Different microwear patterns of scratches on the buccal surface indicate different dietary composition. All samples from 17 individuals have been observed at 200X magnification by utilizing the 3D deep field microscope. After scanning and measuring buccal surface microwear features, the ratio between the average length of the horizontal scratches and the average length of the vertical scratches (LH/LV) can be calculated. Comparing with other researches, Dacaozi population have a LH/LV ratio of 96.93%, which is similar to Veddas with a LH/LV ratio of 95.78%, who are originally hunter-

gatherers living in a tropical forest environment. The results obtained show that people of the Dacaozi cemetery ingested both plant products and animal products which is in accordance with the archaeological researches, historical records and lifestyle in Qinghai nowadays.

Han, Yu

[116] *Analysis of the Faunal Remains at Shangjing City Site, Inner Mongolia (2013 Excavation)*

The Shangjing city site is located on the boundary between agricultural and herding subsistence economies in the Western Liao River Basin, eastern Inner Mongolia. The site was used as the Upper capital in the Liao Dynasty (AD 916–1125) and the Northern capital city in the Jin Dynasty (AD 1115–1234). In 2013, several burials in the Liao and Jin Periods were unearthed, and more than 36,000 faunal remains, including bones and teeth, were collected systematically. Although Liao and Jin are regarded as very important Iron Age dynasties in Northern China, there have only been a few zooarchaeological studies of the two periods; and their subsistence patterns are still unclear. This study explores the faunal remains excavated at Shangjing city in 2013 using morphological, isotopic and ancient DNA analyses to increase the zooarchaeological data in this area as well as to address the relationships between humans and animals in the Liao and Jin Dynasties.

Hankins, Sharon, Yarely Meza (University of Texas Rio Grande Valley) and Cristina Gonzales (University of Texas at Austin)

[11] *Firing Strategies: Experimental Pottery Technology Programme for Belize*

This report is a continuation of the Experimental Pottery Research Program I began in Belize in 2000 (Hankins 2009:177–186). The scarcity of material evidence of pottery manufacture and firing signatures contributes to the relevance of different research strategies to expand our understanding of this technology. Firing pottery is challenging. The technology of constructing pottery is difficult, stressful, and requires constant attention. All the labor, skill, and planning can be lost in the final accumulation of effort. Mastering pyrotechnology and the knowledge of pottery manufacture can be extremely variable. All the additive processes of creating are subject to possible destruction in the fire. Experimenting with different methods of firing teaches us what different firing strategies can produce, and the signatures they deposit (or not) in the archaeological record. Kilns are somewhat more predictable. Bonfire firings, pit firings and other open firings challenge our quest for evidence. This poster will focus on our experiences with different types of bonfire firings we have undertaken in Belize. Every location has so many different environmental issues to consider. In Belize there are seasonal differences to consider, atmospheric conditions, temperature fluctuations (hourly), and of course, time and labor.

Hanks, Bryan (University of Pittsburgh, Department of Anthropology)

[323] *Geophysical and Geochemical Spatial Approaches to Early Copper Metal Production among Bronze Age Communities in the Southern Urals, Russia*

The combination of social, economic, and political variables that led to greater levels of sedentism and demographic growth in human societies has long been a key topic within the study of world prehistory. Indeed, the comparative study of such dynamics has been at the very core of anthropological archaeology with numerous classic case studies stemming from fieldwork in the Americas, Africa, Europe, the Near East, and China. The Eurasian steppes, a vast region stretching half way around the world, has contributed much less to such comparative understandings of early human communities and the forces underpinning the emergence and development of greater levels of complexity in social organization and craft specialization. This paper examines such dynamics within the context of what has been perceived as an exceptionally rapid development in socioeconomic organization connected with the Middle Bronze Age of the Southern Ural Mountains region of Russia. Starting at around 2100 BCE, this region of the Eurasian steppes witnessed dynamic shifts in demography, settlement patterning, conflict, and metal production. This paper will examine recent studies utilizing multi-method geophysical surveys combined with HHpXRF and focused excavation to identify the spatial organization of copper working within and around Bronze Age settlements.

[268] *Discussant*

Hanks, Bryan [343] see Canaday, Timothy

Hanks, Michele

[212] *"That Box is Haunted!" English Paranormal Investigating and the Immateriality of the Past*

Since the late 1990s, paranormal investigating has emerged as a popular means of seeking knowledge of the ghostly or paranormal in England. Paranormal investigators are self-fashioned experts who aim to balance scientific and spiritual perspectives in hopes of proving or disproving the existence of ghosts from an objective perspective. They dedicate significant amounts of their leisure time to reading about, talking about, and researching ghosts or the paranormal. English paranormal investigators ground many of their research practices in engagements with the material remains of the past, including historical artifacts and architectural ruins. Some paranormal investigators believe that these physical objects can act as repositories of or triggers for spirits from the past. Drawing on my long term ethnographic research in the North of England, this paper examines paranormal researchers' epistemological and practical engagement with these physical remains and shows how they produce narratives of the past. Here, I argue that juxtaposing the immateriality of spirits with the materiality of the physical remains of the past opens up an intellectual space in which paranormal investigators reimagine the past while challenging the expertise of orthodox researchers of the past, including historians and archaeologists.

Hanlon, Julie (University of Chicago)

[167] *Carving a Space for Jainism: Jain Rock-Cut Caves in Early Historic to Medieval Tamil Nadu, South India*

The ancient temple city of Madurai, Tamil Nadu is flanked on the east and west by a series of granitic hill ranges and inselbergs. Upon many of these hills are caves containing rock-cut beds and inscriptions that record donations to Jain mendicants. Until recently, interest in these caves has been primarily epigraphical with exiguous analysis of their architectural features and use as Jain residences. In fact, the role of Jains in the history of Tamil Nadu, where they currently represent 0.1% of the population, has been notably marginalized. This paper draws on archaeological evidence and geospatial analysis to situate these cave sites within a broader archaeological context and examine their occupational history and use by Jain monastic communities, beginning c. third century BCE. I suggest that Jain mendicants chose particular hills and caves as the sites of their religious retreats due to their topographic features and close proximity to trade routes and economic and political centers. Moreover, the proximity and inter-visibility of these cave sites poses interesting questions about the organization of early Jain monasticism and the significance of these sites for itinerant merchants, who appear prominently in the donative inscriptions.

Hanna, Jonathan [83] see Walling, Stanley

Hanselka, Kevin (Texas Department of Transportation), Amanda M. Castañeda (Texas State University), Christopher Jurgens (Texas State University), Charles W. Koenig (Texas State University) and Stephen L. Black (Texas State University)

[126] *Multidisciplinary Analyses of a Paleoindian Bison Butchering Event in Eagle Cave*

From its inception, a major objective of the Ancient Southwest Texas (ASWT) project has been to investigate the potential for Paleoindian-age deposits in Eagle Cave. Previously, the oldest dated deposit in the shelter was a zone of dense charcoal and decomposing fiber designated "Lens 14" and dated to about 8500 RCYBP by University of Texas investigations in the 1960s. These excavations terminated beneath Lens 14 at "Zone 6," a stratum described as "sterile yellow cave dust." During the 2016 ASWT field season, excavations through and beyond Zone 6 shortly exposed a discrete layer of scattered, fractured, cut, and burned bison bones. Decomposing plant remains, debitage, and chipped stone tools were interspersed among the bones, and an associated surface hearth contained charcoal, ash, and charred bone. Collectively these materials appear to represent an isolated bison processing event, possibly related to Paleoindian-age bison jump events at Bonfire Shelter, upstream in the same box canyon. We discuss this unique Paleoindian assemblage and interpretations gleaned from ongoing spatial, faunal, macrobotanical, and chipped stone analyses.

Hansell, Patricia (Temple University)

[156] *High-Resolution Imaging of Stone Tools from the First Millennium BC, Grand Cocle Region of Panama: A Digital Archive Initiative*

Archaeological investigations often result in large quantities of stone and ceramic artifacts which, after being catalogued and analyzed, are stored in accessible places and rarely used for further research, student training or public education. Digital technology is changing this. It is revolutionizing the way we do research, archive our results and communicate with others. Based on a sample of time- or functionally-sensitive stone tools from the first millennium BC component at the archaeological site of La Mula-Sarigua in the Grand Cocle Region of Panama, this poster will describe the results of my initiative to (1) digitally photograph and/or scan each object to produce high resolution 3D images, and (2) place them in a publicly accessible web-based repository. The incorporation of high resolution 3D scanned artifacts in digital databases will allow users to manipulate, make observations and take measurements similar to handling the actual artifact. That such databases will be an important tool for analyses in the future is certain as it allows for extensive research independent of the physical objects and institution, the latter of which are often continents apart.

Hansen, Richard, David Wahl (U.S. Geological Survey), Thomas Schreiner (University of California, Berkeley), Donald W. Forsyth (Brigham Young University) and Edgar Ortega (Proyecto Cuenca Mirador; Universidad de San Carlo)

[337] *The Origins of Complex Maya Societies: The Middle Preclassic Period in the Mirador-Calakmul Basin*

Recent multidisciplinary investigations in the Mirador-Calakmul Basin have provided evidence of human sedentary occupation by about 2600 BC. Data from coring of shallow lakes and from small residential structures with postholes in bedrock below Middle Preclassic platforms show evidence of corn pollen, isotopes, and human presence by this early period. Archaeological investigations at sites such as Nakbe, El Mirador, Xulnal, Wakna and El Pesquero, among others, have identified architectural constructions dating to the Middle Preclassic period between 1000 and 400 BC, indicating a rapid and sophisticated cultural ascent. The results indicate that the origins of the first Maya state begins by the early Middle Preclassic period, resulting in the construction of some of the largest structures in the ancient world, as well as architectural systems for the collection and distribution of water, architectural art, agricultural systems, murals, platforms, dikes, terraces, palaces, dams, causeways, and sophisticated commerce and trading systems centuries before Christ.

Hansen, Richard [321] see Thornton, Erin

Hansen, Svend

[221] *Arukhlo: Neolithic Settlement and Ritual Place in Georgia, Southern Caucasus*

The Neolithic way of life arrived in the Caucasus at the beginning of the sixth millennium BC. Recent excavations in Arukhlo in the Republic of Georgia, not far away from the capital Tbilisi, shed light on the occupation of the place between 5800 and 5400 BC. The building activities on the site were several times interrupted by digging deep ditches through the village. In the presentation it will be argued that Arukhlo and probably other places were centers of ritual activities.

Hanson, Eric (USC), Wendy G. Teeter (UCLA) and Lynn Dodd

[189] *Jaunt VR 360 Stereo Video Virtual Reality Camera as a Tool for Historic Interpretation and Archaeological Documentation*

Presentation of an immersive, virtual reality experience of nineteenth century Santa Catalina Island/Pimu that features a digital model of historic structures and virtual reality stagecoach ride across the island as an exploration of the interpretive and documentation possibilities of the Jaunt VR camera.

[189] *Chair*

Hanson, John

[277] *Settlement Scaling Theory, Specialization, and the Greek and Roman World*

In the last decade, there has been increasing interest in using urbanism as a means of investigating the economy of the Greek and Roman world. The most recent research on the relationship between urbanization and economic growth suggests that the correlation between them is not as straightforward as once thought. There is a growing corpus of theory, however, that suggests that modern settlements act as 'social reactors,' which increase the number of opportunities for interactions between individuals, and therefore encourage division of labor and economies of scale, stimulating economic growth. In this talk, I will examine whether the settlements of the Greek and Roman world had a similar effect. To do this, I will estimate the number of professional associations, known as collegia, in a number of sites and use them as a proxy for the number and variety of crafts and trades. This demonstrates that there was a direct relationship between the scale of these settlements and the occupations within them, which is consistent with the models discussed above. This suggests that these settlements might well have made an important contribution to economic growth, which raises important questions about the links between urbanism and the economy over time.

Hanson, Kelsey (University of Arizona), Paula Bryant (Illinois State University) and James Skibo (Illinois State University)

[341] *Acorn Oil Rendering in the Upper Great Lakes*

Recent research in the Upper Great Lakes region has demonstrated the importance of acorns as a dietary staple. As a plentiful and easily storable source of carbohydrates and fats, acorns provide an excellent dietary complement. Organic residue analysis of pottery sherds and fire-cracked rock from Grand Island, Michigan, yielded lipid profiles consistent with nut oil, suggesting that the vessels may have been used to process acorns through boiling or simmering. In order to make many species of acorns palatable, regionally-specific methods for removing harmful tannic acid are documented throughout North America. Because tannic acid is water soluble, rendering oil from acorns through boiling may have been an effective means of producing a storable, high-fat product free of tannins. While ethnohistoric descriptions of rendering oil from acorns exist, the mechanics and

archaeological signatures remain poorly understood. In order to evaluate the hypothesis that ceramic vessels were a crucial component of nut oil rendering, we test a variety of techniques to render acorn oil. The results of these experiments will not only inform the rationale behind changing cooking technologies in the Upper Great Lakes, but may also provide a means for identifying alternative acorn-derived products in the archaeological record.

Hanson, Sydney and Jade d'Alpoim Guedes (Washington State University)

[177] *Millet and Rice on the Move: Adaptive Strategies in the Past and Future*

A growing tradition of archaeobotanical research, one that was pioneered by Steven Weber, is allowing us to form a picture of how millets and rice spread into Southeast Asia. Although rice continues to play an important role in the diet in this area, the use of millet has been slowly forgotten. These two different crops have been alternatively seen as a "cultural package" that coincided with the spread of farmer populations from Southern China, or adaptations to different ecological or climatic conditions. Using crop niche modeling, and new archaeobotanical data, this paper examines these two differing but complimentary perspectives on their adoption and potential futures across Southern China and Southeast Asia.

Hanson, Sydney [260] see Downey, Caitlin

Hanten, Nicholas (University of California, Davis)

[381] *Settlement Patterning and the Ideal Free Distribution in the Ethnographic and Prehistoric Sierra Nevada of California*

The ideal free distribution, which predicts that individuals will assort themselves across habitats of varying quality such that all individuals receive equal fitness benefits, can be an important model in the analysis of human settlement patterning. Despite its simplicity, the ideal free distribution can be difficult to apply to archaeological problems because, in addition to often requiring estimates of population size, the model necessitates a definition of habitat "suitability" in the context of past environments and subsistence systems. The current study attempts to overcome these problems by combining ethnographic data on population size and location with environmental resource distribution data to define habitat suitabilities using the distribution of resources across the landscape and their effect on settlement patterning during the ethnographic period. These results are then compared with prehistoric datasets in an effort to explain settlement and subsistence patterns in the late prehistoric Sierra Nevada.

Hanvey, Vanessa [87] see Stumpf, Tyler

Hao, Side [78] see Li, Yinghua

Hard, Robert (University of Texas at San Antonio), Raymond Mauldin (University of Texas at San Antonio), Kristin Corl (University of Texas at San Antonio), Deborah Bolnick (University of Texas at Austin) and Jacob Freeman (Utah State University)

[344] *Isotope and Hunter-Gatherer Ecology at the Morhiss Site on the Texas Coastal Plain*

We analyze radiocarbon, stable carbon, and nitrogen isotope data from the Morhiss Site (41VT1) located on the Texas Coastal Plain. In 1939–1940, personnel with the Works Progress Administration excavated deep deposits at this large hunter-gatherer site but they lacked adequate chronological control and results were never fully reported. From this location on the Guadalupe River and only 35 km from the Gulf of Mexico, hunter-gatherers could access a variety of habitats. In fact they returned to this productive setting from 5000 BC to at least AD 1000. With National Science Foundation funding we are developing a radiocarbon, stable isotope, and ancient DNA database from curated collections to evaluate the long-term ecological and population dynamics at the site. Site use reoccurred despite climate change, sea level rise, and population growth and the site may have served as an important node in changing patterns of hunter-gatherer land use and territoriality from the Archaic to the Late Prehistoric periods. With preliminary data we analyze the role of estuarine, riverine, and terrestrial resources thru time while considering models of land use.

Hard, Robert [303] see Roney, John

Hare, P. Gregory (Government of Yukon, Cultural Services Branch) and Christian D. Thomas (Government of Yukon, Cultural Services Branch)

[339] *Fragile, Organic Artifacts from Alpine Ice in the Athapaskan Homeland, Southern Yukon, Canada*

Since the late 1990s, a significant collection of fragile, organic artifacts has been collected from melting alpine ice patches in southern Yukon, Canada. The ice patch study area is in the Athapaskan homeland, and was an area strongly impacted by the White River Ash event, ca. 1200 yr BP, which possibly triggered southward migrations of some Athapaskan speakers. This paper will present an overview of the Yukon ice patch project and will include a description of organic hunting artifacts providing new insights into the design of traditional Athapaskan technologies that are relevant to the discussion of Apachean origins. We will focus on the construction of Athapaskan bows, arrows and an ice patch moccasin.

Hare, Timothy (Morehead State University), Rebekah Vermillion (Morehead State University) and Madison Cissell (Morehead State University)

[336] *Mapping and 3D Modeling of Excavations Using UAVs, Photogrammetry, and Lidar*

Using unmanned aerial vehicles (UAVs/drones) to carry photographic equipment and photogrammetric processing of resulting data simplifies and accelerates mapping, 3D modeling, and environmental reconstruction. Construction and expansion of highways through Mayapán and the surrounding region are destroying valuable archaeological remains and environmental features. The 2016 field season targeted these areas for rapid recording and depended on UAV photography and photogrammetric processing for site and excavation photos as well as production of 3D modeling of archaeological remains and excavation units. In this presentation, I outline the technology used, the data processing workflow, and the resulting products including oblique photos, orthorectified aerial photo mosaics, digital elevation models, 3D models, and data layers for use in geographical information systems. I conclude with an example of implementing UAV-borne lidar and multispectral cameras into archaeological mapping and modeling.

Hare, Timothy [9] see Vermillion, Rebekah

Harke, Ryan

[223] *Sclerochronology of the Tiger Lucine Clam (Codakia orbicularis): Implications for Florida Keys and Northern Caribbean Archaeological Site Seasonality*

The Tiger Lucine (*Codakia orbicularis*) is a large bivalve native to the West Indies. This tropical species is a common constituent of late prehistoric (AD 800–1500) shell middens in the Florida Keys, the Lucayan Archipelago, and the Greater Antilles (e.g., Jamaica). *C. orbicularis*' prominence in the archaeological deposits of these regions is the predictable result of its abundance, relative ease of access, and widespread efficacy as both a subsistence resource and raw material for tools (e.g., fish-net sinker). For the present study, I constructed stable isotope profiles ($\delta^{18}\text{O}$ and $\delta^{13}\text{C}$) for modern and archaeological (~AD 1250) *C. orbicularis* specimens from the Lower Florida Keys to determine growth rates and seasonality, and season(s) of collection, respectively. Preliminary results align well with published data from the Bahamas, providing further support that this species precipitates shell throughout most of the year, ceasing growth only at or near winter minima temperatures. The archaeological specimen yielded three annual temperature ($\delta^{18}\text{O}$) cycles, ending on the most negative value observed in the dataset (-2.1‰), suggesting it was collected during the summer. These stable isotope data form a solid foundation from which prehistoric season of habitation can be ascertained for the Florida Keys and western North Atlantic.

Harkins, Kelly (University of California Santa Cruz), Laura Weyrich (Australian Center for Ancient DNA, University) and Lars Fehren-Schmitz (Human Paleogenomics Lab, University of California)

[143] *Challenges of Using NGS to Detect T. cruzi in Human Remains from Precolumbian South America*

The trypanosomatid parasites are responsible for devastating human disease worldwide. In the Americas, *Trypanosoma cruzi* is the causative agent of Chagas Disease (CD), the most epidemic zoonosis in Latin America today. The clinical manifestations of CD, however, have been recognized in archaeological human remains from South America as early as 9,000 years ago. We present preliminary results of a project that applies paleogenomic methods, including targeted enrichment and next-generation sequencing (NGS), to capture *T. cruzi* in precolumbian human remains, incorporating material with and without signs of infection. To date, the molecular detection of *T. cruzi* via PCR has been reported for a number of cases, but PCR products have limited power to address evolutionary questions. If successful, reconstructed NGS data from ancient parasites will be used to test hypotheses regarding the origins, timing and dispersal of human-adapted lineages in ways that PCR products cannot. NGS methods, especially detection via metagenomic screening, must contend with their own challenges, namely false-positives and determining a "presence/absence" threshold for sequence reads that match an organism of interest. We report the initial NGS results for 70+ individuals from mostly Peru and Chile and discuss the major challenges and pitfalls in interpreting and authenticating these data.

Harkins, Kelly [143] see Fehren-Schmitz, Lars

Harkleroad, Eric

[282] *United in Blood! Rituals of Violence and Warfare in Iron Age Britain*

Discussions of ritual in society often focus on how ritual is used to bring individuals, communities, and larger social groups together. The role of ritual in violent interactions and warfare is less often considered and often what discussion there is focuses on the use of warfare to procure captives for public rituals, such as execution. Virtually ignored in this discussion is the role ritual plays in routinizing violence and warfare and how this ultimately impacts individuals and societies. This is especially true for the Iron Age in Britain, with virtually no serious consideration of violence and ritual. I examine evidence from sites across Wessex, in southern England, looking at the intersection of ritual and violence in everyday life during the Iron Age. Specifically I examine the ways rituals associated with violence and warfare impacted individuals and communities while examining the regional effects of these practices. Here the emphasis is on ritualized aspects of warfare and violence, not "ritual warfare," a phenomena that is observable in today's modern armies as well as in the past.

Harmand, Sonia

[313] *Discussant*

Harmsen, Hans (Nunatta Katersugaasivia Allagaateqarfialu//Greenland National Museum & Archives), Christian K. Madsen (Nunatta Katersugaasivia Allagaateqarfialu//Greenland), Henning Matthiesen (National Museum of Denmark), Bo Elberling (CENPERM, University of Copenhagen) and Jørgen Hollesen (National Museum of Denmark)

[224] *A Ticking Clock? Considerations for Preservation, Valuation and Site Management of Greenland's Coastal Archaeology in the Twenty-First Century*

Documenting and evaluating the rate of deterioration at coastal archaeological sites presents a number of fundamental challenges in the Arctic. In Greenland for example, increasing soil temperatures, perennial thaws, coastal erosion, storm surges and pioneer plant species such as dwarf willow and dwarf birch are observed as increasingly detrimental to the long-term preservation of archaeological deposits and features found scattered along the country's west coast and extensive inner fjord systems. Since 2009 several projects, including the ongoing REMAINS (REsearch and Management of Archaeological sites IN a changing environment and Society) project, have explored the variable factors that currently threaten Greenland's heritage landscape in the twenty-first century. This paper specifically addresses the threats immediate to house middens located in the littoral zones of Greenland west coast and reviews data collected during the project's fieldwork in 2016. Information gathered provides a baseline for "ground-truthing" predictive models of preservation and deterioration of material such as bone, antler and wood frequently observed in varying states of decay in these coastal middens. Knowledge derived from the project will assist heritage managers, conservationists and local people with new tools to actively document annual changes observed at archaeological sites at both the local and regional scale.

Harper, Ross K. (AHS) and Sarah P. Sportman (AHS)

[142] *"First Fruits" Household Foodways at the ca. 1638 Waterman Site House, Marshfield, Plymouth Colony, Massachusetts*

In *New England's First Fruits* published in 1643 in London, an anonymous author addressed various questions and misconceptions prospective colonists often had related to life in the colonies. The author assured readers there was an abundance of food that was "farre more faire pleasant and wholesome than here." While early chroniclers provide clues to the hardships of the early years of Plymouth Colony, very little detail about First Period foodways is known from documentary data and archaeological evidence in eastern Massachusetts. The Waterman Site in Marshfield is associated with Robert and Elizabeth (Bourne) Waterman, who married in Plymouth in 1638 and were related to the Winslow and Bradford families. Archaeological evidence indicates that the house was a modest earthfast structure that burned down only after a few years of occupation and was never rebuilt. An integrated research approach, including study of faunal and botanical remains, ceramics, cooking implements, and food storage features, along with associated historical documentation, is providing the first detailed information on the material culture, subsistence strategies, and general lifeways of a Pilgrim family. Ongoing analyses indicate that the Watermans practiced a dynamic household economy that thoroughly integrated Old World and New World plants, dairying, fishing, and hunting.

Harris, Alison J T (Dept. of Archaeology, Memorial University of Newfoundland), Ana T. Duggan (McMaster University), Stephanie Marciniak (McMaster University), Hendrik Poinar (McMaster University) and Vaughan Grimes (Memorial University of Newfoundland)

[144] *Maritime Archaic Subsistence in Newfoundland, Canada: Insights from $\delta^{13}C$ and $\delta^{15}N$ of Bulk Bone Collagen and Amino Acids*
Port au Choix-3 (4800–3600 BP) is a large Maritime Archaic mortuary site in northwestern Newfoundland. Since the 1940s, archaeological excavations have yielded thousands of artifacts and the skeletal remains of over 100 individuals. This site has been instrumental for defining the Maritime Archaic tradition, and for understanding human-environment interactions during the Archaic occupation of Newfoundland and Labrador. As such, it is currently the focus of a multi-isotope and ancient DNA project exploring the lifeways and biocultural relationships of the Maritime Archaic people. This paper presents the results of our investigation into diet and resource use through stable isotope analysis of bulk bone collagen and collagen amino acids. Our analyses have revealed considerable isotopic variation within the sample, indicating the presence of several distinct dietary patterns. While the variation may in part be attributed to sex-based dietary differences, it also indicates that Maritime Archaic subsistence in Newfoundland can no longer be generalized as a single adaptation. We will examine the results in relation to site distribution data, and in light of recent interpretations of Maritime Archaic social organization and settlement patterns in Newfoundland and the Strait of Belle Isle region.

Harris, Jillian [17] see Bowie, Kristina

Harris, Kathryn (Washington State University)

[343] *Lithics and the Late Prehistoric: Changing Adaptive Strategies on the Southeastern Columbia Plateau*

How do people adapt to the changing natural and social environment of the late prehistoric (3,000 BP to historic), Columbia Plateau? By interacting and learning from one another, and by adapting their technology. Though frequently characterized as a homogenous culture area over the past 3,000 years, previous analyses show differences in artifact form, assemblage composition and household features. This project traces these changes through the stone tools of the archaeological record. Research questions include: can the cultural learning and adaptive strategies of late prehistoric cultural groups be identified in the diachronic and spatial variability of southeastern Columbia Plateau projectile points? And, how does obsidian procurement reflect changing cultural interactions and exchange networks in the southeastern Columbia Plateau over the last 3,000 years? Using concepts from evolutionary and social network theories, this project employs obsidian provenience sourcing and the morphometric analysis of projectile points to trace the ways people dealt with these pressures through shifting adaptive strategies and increased intergroup interaction. Ultimately, I consider the universally important question of how and why cultures interact and change through time; and the particularly important question of how the indigenous inhabitants of the Columbia Plateau came to establish the significant Ethnographic Pattern lifeway.

Harris, Khadene (Northwestern University)

[317] *A Yard and Its Belongin's: Archaeological Research of Laborer Houseyards on the Morne Patat Estate, Dominica*

Caribbean "yards" and their associated structures have long been of interest to archaeologists determined to understand how the domestic spaces of enslaved laborers both embodied and reflected kinship ties, labor arrangements, and sociopolitical shifts. Often regarded as an elemental feature of Caribbean society, houseyards are the spaces where the repeated acts of daily life took place, as a result, understanding how enslaved laborers utilized and altered their domestic space over generations, offers key insight into the conditions of enslavement and subsequent freedom. In this presentation, I explore and discuss the defining characteristics of houseyards, using archaeological evidence from the Morne Patat Estate in Dominica. First, I situate each houseyard within a plantation-wide chronology using ceramic and other diagnostic data. Then, I discuss the shifts in material and spatial practices that occurred, linking the actions and choices of the enslaved to wider trends in plantation archaeology.

Harris, Lucille (U.S. Fish and Wildlife Service, Alaska Region)

[334] *Interior Salish Organizational Principles: Recasting the Dynamics of Sociopolitical Change in Aggregated Village Archaeology on the Northern Plateau*

The Middle Fraser Canyon of south-central British Columbia is well-known for the large Late Prehistoric aggregated pithouse villages that line the terraces of the region's major rivers and tributaries. These villages represent a dynamic period in the history of Northern Interior Salish societies. Our understanding of the cultural dynamics underlying the formation and breakup of these large villages has been limited by reliance on theories that are rooted in uniquely Western concepts of individuality and the naturalized state of self-determination. In short, the theories misunderstand the dynamics of culture change associated with the aggregated village period precisely because they draw on insights that are external and alien to the system they are invoked to explain. In this paper I introduce a model of Interior Salish Secwepemc sociopolitical dynamics proposed by cultural anthropologist Elizabeth Furniss and briefly discuss the application of that model to the archaeology of the aggregated villages. Finally, I demonstrate the ethnographically documented relationship between sociopolitical organization and settlement patterning. I propose that relationship be used as a means of further refining understanding of sociopolitical dynamics during the aggregated village period.

Harris, Matthew (AECOM Technologies)

[112] *Discussant*

Harris, Megan (Simon Fraser University)

[387] *Ground Stone Disk Bead Distribution and Frequency in Katzie Territory, British Columbia*

Inquiries into ground stone disk beads in the Salish Sea region have focused on frequency counts at one particular archaeological site, regional syntheses of distribution, or the use of beads as a means to explore Coast Salish expressions of wealth and status. Although these studies provide important information relating to the social role of these beads, they are either too broad in focus or ignore the interplay of beads between neighboring sites. This presentation examines the inter site variability of beads recovered from archaeological sites within Katzie territory. Using the Katzie territory as an example focuses on the idiosyncratic uses of beads and the role that they may have had for the Katzie people. The meaning of beads for particular groups of people is often overlooked in both large regional syntheses and myopic frequency examinations of individual archaeological sites.

Harris, Susan, Lynn Fisher (University of Illinois, Springfield), Michael Jochim (University of California, Santa Barbara), Corina Knipper (Curt-Engelhorn-Zentrum Archäometrie gGmbH) and Rainer Schreg (Römisch-Germanisches Zentralmuseum)

[90] *Neolithic Landscapes of Southern Germany: Insights from Regional Survey*

Landscape archaeology in Central Europe has historically built on a foundation of high-resolution excavations of village structures. In this poster, we combine results of systematic plow zone survey carried out by two research groups to explore and reflect on the contributions of regional survey for understanding Neolithic land use in southern Germany. Surveys were conducted in two areas with contrasting archaeological records and geographic characteristics. On the southeastern Swabian Alb plateau, active work by avocational archaeologists provides a foundation for systematic landscape archaeology spanning the Early/Middle, Upper, and Final Neolithic. To the south, in the Alpine Foreland, exceptional preservation and detailed

excavations of Upper and Final Neolithic sites in lakes and bogs raise questions about the presence, intensity, and type of Neolithic activities that might have occurred outside the intensively-studied wetlands. We analyze the distribution of Neolithic materials in lithic scatters and compare their location and density between regions and across time periods to consider questions of settlement continuity, nonresidential activities, and effects of factors such as site visibility and modern land use on known site distributions.

Harrison, Ramona (University of Bergen, Norway)

[32] *Skuggi and Siglunes: Two Icelandic Settlement Sites*

This paper presents results from multidisciplinary investigations at two Icelandic sites from the same region: Skuggi and Siglunes. The small subsidiary farm at Skuggi was likely settled during the earliest stages of Icelandic colonization and was located on a steep mountain slope, about 150 m above the valley bottom. Ideas on its occupation history and causes of abandonment will be discussed, as well as the possibility that the decision to abandon the settlement was heavily influenced by landslides in that particular area. Siglunes, located in the outer fjords of the same region, was also settled early during the island's colonization. There, well-preserved faunal remains were recovered from several midden deposits infilling the remains of structures such as dwellings and boat houses. From ongoing faunal analysis, we know now that this site may have been one of the fishing sites providing the region called Eyjafjord with various preserved fish products. Possible impacts on the landscape as well as on both these sites will be discussed.

Harrison, Laura (University of South Florida)

[124] *Virtualization as a Method for Heritage Preservation: A Case Study from Seyitömer Höyük, Turkey*

In Turkey, rapid industrialization is one of the most prescient concerns facing the country's natural and cultural heritage. Increasingly, archaeologists are expanding their traditional tool kit to incorporate methods of virtualization, to create 3D models of sites, structures, and artifacts. This paper offers a case study of digital heritage preservation at Seyitömer Höyük, an Early Bronze Age (ca. 3000–2000 BCE) urban center that is located within an active coal mine, and is under direct threat from industrialization. This paper reveals how Information and Communication Technologies (ICT) were used to create a photorealistic 3D model of this endangered site, and produce a valuable interpretive and educational tool available in an open access format on the Internet. It is argued that the use of such digitization strategies is a valuable component of site management planning, particularly in cases where archaeological resources face imminent danger from external threats.

Harrison-Buck, Eleanor (University of New Hampshire)

[157] *It's the Journey, Not the Destination: Maya New Year's Pilgrimage as Circumambulatory Movement and Regenerative Power*

Maya ethnohistory suggests that burning incense, erecting monuments, penis bloodletting, and pilgrimage were all activities associated with New Year ceremonies. These annual rites were calendrically inked and aimed at ensuring agricultural renewal and earthly regeneration. Today, Maya New Year ceremonies involve initiation of young men prior to marriage and sexual relations, requiring self-sacrifice and long-distance pilgrimage with male elders. Cross-examining these data alongside archaeological evidence, I suggest similar New Year traditions existed in Postclassic and Terminal Classic times (AD 800–1500). Maya pilgrimage was not about acquiring a particular thing or venerating a specific place or destination. It was about the journey or what Tim Ingold (2010) calls "ambulatory knowing." The Maya gained cosmological knowledge, linking the movement of their body to the annual path of the sun and their sexuality and human regenerative power to earthly renewal. New Year circumambulatory rituals express a core ontological principle of dualistic transformation that the Tzotzil Maya call Jaloj-k'exoj, demarcating physical change (jal) from youth to adulthood and transference or replacement (k'ex) of power in official leadership roles. This distinct way of knowing the world emphasizes one's reciprocal relationship with it, constituting mutual interdependency in both same-sex and cross-sex relationships (sensu Strathern 1988).

Harrod, Ryan (University of Alaska Anchorage)

[31] *Beyond Broken Bones: The Value of Creating an Osteobiography when Analyzing Violence in the Past*

Population level analyses of violence that are focused on quantifying and comparing traumatic injuries on human skeletal remains recovered from an archaeological context are crucial for understanding violent interactions through time and across regions. However, these types of studies are also limited because, by design, they place less emphasis on individuals and their lived experience. In contrast, when researchers create what Frank and Julie Saul called an osteobiography for each set of remains, they are attempting to reconstruct as much about each person as possible. An osteobiography tells a story about who the skeletal remains represent using an array of different osteological methods, which include age-at-death, biological sex, indicators of diet and nutrition, markers of activity, pathological conditions, and traumatic injuries. The result is that in addition to counting and describing trauma it is possible to place the individual into a larger sociopolitical context and begin to potentially understand why they were at risk of violent altercations, what the consequence of the resulting injury would have been, and how the culture viewed violence.

Harrod, Ryan [373] see Stone, Pamela

Harrower, Michael (Johns Hopkins University) and Joseph C. Mazzariello (Johns Hopkins University)

[171] *Towns and Villages of an African Empire: Eastern Tigris Archaeological Project (ETAP) Archaeological Survey 2005–2008*

The Empire of Aksum was one of the earliest and most influential African complex polities, yet remains one of the world's most scantily documented ancient civilizations. The Eastern Tigris Archaeological Project (ETAP) surveyed a 196 km² area between the ancient capital city of Aksum and the Red Sea over four field seasons from 2005–2008. This work documented 137 archaeological sites, including seven ancient towns larger than 6 hectares, and contributes a substantial body of data on geographies of Aksumite and Pre-Aksumite polities. Spatial analysis of this dataset yields substantial insights regarding site hierarchies, site clustering, trade routes, and associations among sites and environmental variables, including landforms and hydrology. Collectively, ETAP archaeological survey clarifies key issues, and raises a wide range of new questions poised to be addressed by a steadily increasing number of international teams and local scholars working in the region.

Harry, Karen (University of Nevada-Las Vegas)

[84] *Chair*

Hart, Elizabeth (University of Virginia)

[55] *Lithic Artifact Production at the Large-Scale Pharaonic Chert Quarries of Wadi el-Sheikh, Egypt*

Recent research into quarrying and lithic production in Wadi el-Sheikh, Egypt by the University of Vienna has identified activities extending from the Middle Paleolithic to modern times. These include Middle Paleolithic use of surface materials, Neolithic chert quarrying, Pharaonic gypsum extraction, quarrying and production of groundstone, ochre collection, and small-scale independent modern salt quarrying. However, the most striking activities are the large-scale Pharaonic period chert quarries. These massive works stretched for 8 km in one section of the wadi alone. Mining strategies included

surface pits, trenches, vertical shafts, and deep horizontal galleries. The surfaces are carpeted in lithic debitage, and stratified deposits over 1 m deep have been identified. Surface collection and analysis of materials from four 1 × 1 m test units has revealed evidence for the manufacture of prismatic blades, bifacial knives, and bifacial bangles. Analysis of the distribution of tool fragments, cores, debitage, and debris indicates that production was likely segmented, with different types and stages of production taking place across the site. This evidence combined with finds of barracks-like structures, and the sheer scale of the activities, indicate that these quarrying expeditions were likely organized by the state—a rare case for chert quarrying worldwide.

[55] *Chair*

Hart, Siobhan (Binghamton University) and George Homsy (Binghamton University)

[159] *Stories from North of Main: Neighborhood Heritage Story Mapping*

This paper discusses the use of GIS Story Map applications for discerning shared values and community capacity building in a small, diverse, deindustrialized urban neighborhood in Binghamton, New York. Most local sustainability and revitalization projects focus on homogeneous communities that have shared stories and understandings about the neighborhood's past and present. But in the economically marginalized and diverse neighborhoods of America's smaller rust belt cities, narratives of decline dominate and shape perceptions of the place and its residents, perpetuating race and class-based divisions. The Neighborhood Heritage and Sustainability Project is a community-based effort to understand neighborhood change and create an alternative to elite-driven heritage. Through interviews with residents, business owners, activists, and city officials we are working to identify shared values, aspirations, and experiences that can be the basis for new neighborhood stories. Using the GIS Story Map Application, we are mapping the multiple meanings attached to different neighborhood places, layering audio, images, and text to create stories of work, home, and community life. Here, we report on the results of this project and evaluate the effectiveness of digital mapping and storytelling for a marginalized urban neighborhood.

Hart, Tina (Logan Simpson), Michael L. Terlep (Logan Simpson), David Lewandowski (Logan Simpson), Theodore Tsouras (Logan Simpson) and Francis E. Smiley (Northern Arizona University)

[366] *New Contributions to Black Mesa Archaeology*

Between 1967 and 1983 the Black Mesa Archaeological Project (BMAP) conducted extensive survey and excavations on Peabody Western Coal Company lease area on Hopi and Navajo tribal lands on northern Black Mesa, Arizona. The project contributed immensely to our collective understanding of the Kayenta Branch of Ancestral Pueblo and prehistory in northern Arizona. In support of a current environmental impact statement, Logan Simpson recently completed a Class III pedestrian survey of nearly 4,000 acres of Peabody-leased lands on Black Mesa owned by the Navajo Nation and Hopi Tribe. This poster presents an overview of the current archaeological project on Black Mesa and details how the collaborative and innovative approach that included working with Navajo and Hopi archaeologists and communities; and the use of modern technology, such as aerial drone photography and 3D site and artifact modeling, has contributed to our understanding of the prehistory and history on northern Black Mesa.

Hart, Thomas (University of Texas at Austin), Luisa Aebersold (University of Texas at Austin), Nicholas Brokaw (University of Puerto Rico-Río Piedras) and Sheila Ward (University of Puerto Rico-Río Piedras)

[83] *Ecological and Paleoethnobotanical Research at the Programme for Belize Archaeological Project*

Archaeological research requires interdisciplinary scholarship to answer broad questions relating to resilience, social complexity, climate, and environmental impacts in Mesoamerica throughout ancient Maya times and into the present. RBCMA, PfBAP, plant ecology, and paleoethnobotany have provided a platform to reconstruct ancient Maya landscapes, which delves into the nuances of human-environmental relationships in northwestern Belize. Ecological studies of the impacts of ancient Maya on soils, and studies on present soil-tree species relationships, suggest that the ancient Maya have greatly affected the present distribution and abundance of tree species. The present heterogeneity of soil characteristics over the landscape also suggests the opportunities the ancient Maya had for varied agriculture. Paleoethnobotanical studies at PfBAP have demonstrated that it is possible to recover preserved archaeological plant remains from harsh tropical conditions and that these types of studies hold the potential to advance understanding of ancient Maya agriculture and land use beyond simple maize, bean, and squash subsistence strategies. This paper is a synthesis of research on the articulation among botany, ecology, and human populations at the RBCMA over the last 25 years, as well as of current and future research projects.

Hart, Zebulon (Morehead State University Craft Academy), Mitchell Grothaus (Morehead State University Craft Academy) and Timothy Hare (Morehead State University)

[9] *UAV-Based Mapping and 3D Modeling of Maya Sites in the Northern Yucatán*

During our 2015 and 2016 field seasons, we mapped and created 3D models of numerous excavation sites in the Northern Yucatán. Several of these sites are located in Mayapán's periphery and many were scheduled for destruction due to highway expansion. We used unmanned aerial vehicles (UAVs/drones) to carry photographic equipment to collect both vertical and oblique photos as well as videos. In several areas we used both visible light and a near-infrared (NIR) cameras. The resulting images were processed in photogrammetric software to generate orthorectified airphoto mosaics and 3D models of each fieldwork location. These products were integrated into a Geographical Information System (GIS) to facilitate analysis. In this poster, we outline the technology and data processing workflow used and display the regional overview of all fieldwork sites with examples of notable maps and models. The various sites include small groups of residential and public architecture, different sizes of platforms, and some monumental architecture. Fieldwork at mapped locations range from minimal clearing of vegetation with test excavations to completely cleared with broad horizontal excavations.

Hart, Zebulon [9] see Grothaus, Mitchell

Hartford, Alexis (Harvard University) and Sarah Loomis (Harvard University)

[9] *Modeling Hands: Photogrammetric Analysis of Hand Imprints in Ceramic Vessels from Copán, Honduras*

In AD 756, Ruler 15 of Copán, Honduras—a Classic Maya settlement—erected Stela M in front of the Hieroglyphic Staircase as a permanent marker of a calendrical event—the 9.16.5.0.0 Period Ending. As part of the ritual ceremony conducted at the time of the stela's dedication, offerings were placed under the stela to activate or ensoul the monument. In a recent study of the ceramics from this offering conducted at the Peabody Museum of Archaeology and Ethnology at Harvard University, the authors discovered handprints impressed into the interior bases of two coarseware ceramic vessels. To further explore these impressions and their implications, the authors utilized photogrammetry to create three-dimensional computer models of these ceramics' interiors, allowing for greater analysis of their shape, size, depth, and detail. Through a more holistic analysis of these impressions, the authors hope to gain an understanding of the production setting, including the individuals involved in the production of these ritual objects.

Hartman, Lynn [366] see Hammer, Ben

Hartse, Caroline [194] see Aranyosi, Floyd

Hartshorn, Tony [97] see Agenten, Courtney

Harvati, Katerina [143] see Haller Von Hallerstein, Sophia

Harvey, David

[383] *Despotism and Territorial Behavior: Low Population Density Foragers and Territorial Maintenance*

Habitat distribution theory has been applied to a variety of archaeological research programs. The success of the framework has been largely demonstrated through the use of the ideal free distribution (IFD) model to elucidate the nature of colonization and settlement of insular environments. However, territorial maintenance, especially in the face of resource competition, may require the occupation of less suitable habitats as a means of controlling access to resources and land. This paper focuses on the less utilized ideal despotic distribution (IDD) model and the role of territorial maintenance among low population density groups. I present a model of territorial establishment and maintenance for the Tubatulabal of the far southern Sierra Nevada that posits an IDD strategy is best suited for territorial maintenance among low population density foragers. Recent archaeological investigations aimed at testing the model suggest that a shift from an IFD to an IDD strategy in the region began when the Tubatulabal were circumscribed by larger population density groups ca. 1500 BP.

Hasaki, Eleni (University of Arizona)

[323] *Space, Workforce, and Scale of Production: Ethnoarchaeological Approaches to Craft Workshops in Ancient Mediterranean*

More than dots on a map, the craft production loci need to be examined for the space they occupy: their size, organization, and capacity. Spatial analysis can put constraints on workforce size and scale of production, allowing us therefore to reconstruct more accurate models of craft economy. We can also attempt to correlate space occupancy with scales of craft specialization. The "chaîne opératoire" can be examined parallel to the "espace opératoire" to establish what the spatial requirements use flexibility, and archaeological visibility are for different stages of craft production. Furthermore, the study of workshop space impacts discussions of structure and length of apprenticeships and ability to stockpile, to name a few. The paper will examine archaeological and ethnoarchaeological cases of craft workshops in the Mediterranean.

Hasenstab, Robert

[178] *The Use of Geographic Information Systems in the Analysis of Prehistoric Social Dynamics*

Geographic Information Systems (GIS) are typically used in Archaeology to analyze the patterning of sites in a region. Part of this patterning is the result of past human social behavior. Such patterns are manifested in the spatial arrangement of sites on the landscape. These patterns and arrangements can be analyzed using certain GIS methods. This paper presents GIS methods sensitive to analyzing prehistoric social dynamics. Demonstration of the methods is shown by way of example as well as through review of extant literature.

[311] *Discussant*

Haslam, Michael (University of Oxford)

[313] *Moderator*

[313] *Discussant*

Hastorf, Christine A. (University of California-Berkeley)

[177] *Presentation of the Past; Interaction and Storytelling; How We Grow through Dialogue*

While archaeobotanist's work hard at interpreting botanical data, one way to improve our interpretations is to interact about our material, tacking between raw and adjusted data to better understand those transformations with others, bringing us closer to the past. Like a gear change, presenting material and hearing responses make a big difference in our explanations and perspectives. I stress this here because of Steve's crucial initiation of the Society for Ethnobiology some years ago, which has allowed many of us in the United States to learn about the importance of presenting and listening to colleagues. Discussing data in the context of current methods and theories applied to paleoethnobotany launched the meetings and continues to allow us to advance our interpretations.

[65] *Discussant*

Hastorf, Christine A. [95] see Weide, D. Marie

Hatch, Mallorie (Arizona State University)

[185] *Warfare in the Mississippian World: Comparing Variation in War across Small and Multi-Mound Centers*

Warfare during the Mississippian Period (ca. AD 1000–1500) of the U.S. midcontinent and southeast has been hypothesized as an important political and social practice throughout the region. This paper will explore diachronic and synchronic evidence of warfare, comparing and contrasting evidence between large and small sites. Particular emphasis will be placed on observations of warfare patterns in the Central Illinois Valley of west-central Illinois. Skeletal remains with warfare-trauma have been infrequently recovered from large multi-mound centers like Moundville and Cahokia. While skeletal trauma is found in low frequencies at these sites, large-scale fortifications and warrior iconography on portable art objects represent important evidence of war's importance. In contrast, warfare-related skeletal trauma has been recovered in the highest frequencies from small and medium-sized Mississippian villages and towns. Available evidence indicates that war may have functioned differently between the periphery and mound centers. The large size of and fortifications surrounding mound centers may have dissuaded ambushing enemies, creating more coordinated attacks. Warfare also served as a coercive threat, curbing the aspirations of loosely consolidated chiefs and reinforcing ideological dominance at large centers. Ambush warfare may have been more endemic at smaller sites due to a reduced defensive capacity.

Hatté, Christine [226] see Boeda, Eric

Hattori, Taichi [330] see Tsutaya, Takumi

Hauman, Cathleen (Opus International Consultants)**[229]** *Cooking Up a Storm*

Food is not only essential for survival but also an important element of any culture. Artifacts for the storage, preparation and serving of food and drink form a large proportion of archaeological assemblages demonstrating that this has always been the case. Understanding how these artifacts were used gives us valuable insight into our past. Organic residue analysis allows us to more accurately determine how a vessel was, in fact, used. My research looked at several vessels sourced from Thailand to determine if it was possible to undertake residue analysis in the changeable climate and conditions found in Southeast Asia. Residues were successfully extracted and preliminary interpretations were made of the results. Since this work was undertaken a number of successful organic residue analyses have been carried out in Southeast Asia. Using the new data these analyses afford, and through comparison with modern subsistence practices in Thailand, I aim to provide a more in-depth interpretation of my results and a fuller picture of what people were storing, cooking and serving in their ceramic vessels in the Bronze and Iron Ages of Thailand.

Haun, Melissa [329] see Wesp, Julie K.

Hauser, Mark (Northwestern University)**[317]** *Archaeological Survey of Colonial Dominica*

The Archaeological Survey of Colonial Dominica centered household production, provisioning, and consumption in the relationship between colonies and metropolises. This paper introduces this session, which develops an approach that considers the political economy of colonial empires at the human scale. As a site of imperial contention between Britain and France, Dominica's material record can help examine the similarities and differences in how land, labor and commerce was imagined in the homeland and practiced on the frontier. Because slaves were not only producers of export goods but consumers of manufactured items, it is possible to examine the ways in which household consumption was regulated by functional demands, competition or social solidarity.

[317] *Chair***Hausmann, Niklas (Institute of Electronic Structure and Laser—FORTH) and Demetrios Anglos (Institute of Electronic Structure and Laser—FORTH)****[223]** *Making a Case for Large-Scale Seasonality Studies: Preliminary Results from the ACCELERATE Project*

The chemical composition of carbonate shell from paleoecological and archaeological assemblages is laborious to analyze, yet the information that is locked within shell deposits worldwide contains valuable insights on past environments and human ecology. At present, studies struggle with the acquisition of sufficient amounts of data to make robust interpretations. Large amounts of information are inaccessible due to costly and time-intensive techniques. Here we aim to develop the technique of Laser Induced Breakdown Spectroscopy (LIBS), which will allow rapid chemical analyses of carbonates, increasing the cost efficiency and making datasets more comprehensible. We apply the technique to various mollusk species around the world, to develop a rapid and affordable method and to globally advance the reconstruction of climate change, exploitation of coastal resources and human-landscape interactions. Furthermore, we argue for an increase in sample numbers within archaeological shell accumulations, to use spatially grouped seasonality data as temporal scaffolding of the archaeological deposit. By making use of the shell matrix in this way, it is possible to answer questions regarding, seasonal context of burials and artifacts, identification of single episodes of mollusk consumption (feasting), and to enhance chaîne-opératoire studies by adding a temporal component.

Hawkes, Kristen [282] see Parker, Christopher

Hawkins, Alicia (Laurentian University) and Suzanne Needs-Howarth (Perca Zooarchaeological Research and Trent University)**[260]** *Diagnostic Elements and Interobserver Variation in the Identification of Fish Bones*

Research by us and others has demonstrated that the taxonomic identification of fish bones from archaeological sites varies between analysts. While rarely acknowledged, this variation may be significant enough to result in different interpretations of site function and seasonality. The level of specificity of identifications and the elements considered identifiable are two important sources of variation. Other factors include the nature of the reference collection used and the experience of the analyst. Using samples from the lower Great Lakes region, in this poster we consider whether use of a select suite of diagnostic elements would improve reliability of identifications.

Hawkins, Hannah, Melissa Torquato (Purdue University), Jessica Thompson (Emory University), Emma James (University of Queensland) and Erik R. Otárola-Castillo (Purdue University)**[191]** *On Point-Cloud 9: A Replicable Protocol to Model 3D Point Clouds of Artifacts as 3D Surfaces*

The comparative study of artifact-form across time and space is fundamental to archaeological inquiry. Increasingly accessible 3D-scanning technology has allowed digital models of artifacts to have a prominent role in archaeological analyses. With this technology, researchers can generate digital 3D models and point clouds representing scanned artifacts to be later analyzed and distributed to other scientists through open-source repositories. However, because comparative morphometric analyses of 3D digital artifacts are recent, common protocols to model point-cloud data have not been established. This makes research replication difficult. Here, we provide a replicable protocol to model 3D surfaces from point cloud data using Meshlab. We show how to import text files containing the raw 3D point-cloud coordinates acquired using any scanning instrument. We proceed to model these point clouds as surfaces by creating, cleaning, and optimizing a triangular mesh, removing outliers and noise generated by the instrument. Finally, the 3D mesh model can be exported as several common 3D-file formats. As a case study, we apply this protocol to 3D point-clouds of experimental marks on bone, and conduct a comparative morphometric analysis to discriminate between bone-marks. This protocol is simple, replicable, and applicable to any point cloud data representing artifacts.

Hawkins, Stuart [180] see O'Connor, Sue

Haws, Jonathan (University of Louisville), Michael Benedetti (University of North Carolina Wilmington), Nuno Bicho (Universidade do Algarve, Portugal), João Cascalheira (Universidade do Algarve, Portugal) and Lukas Friedl (University of West Bohemia, Czech Republic)**[165]** *The Middle-Upper Paleolithic Transition in Southern Iberia: New Dates from Lapa do Picareiro, Portugal*

The transition from Middle to Upper Paleolithic in western Eurasia remains a hotly debated and intensely researched archaeological problem. Recent developments in radiocarbon dating and genetics have permitted some refinements to our understanding of the spatiotemporal process but many issues

remain unresolved. For the Iberian Peninsula, Zilhão's "Ebro Frontier" model of late Neanderthal survival and subsequent replacement by anatomically modern humans has held sway for over two decades. Unfortunately, this and other models remain open to debate because of persistent problems with stratigraphic integrity, depositional hiatuses, and dating uncertainties at the relevant Middle-Upper Paleolithic transitional sites. New radiocarbon results from these sites have overturned their status and some have questioned the idea of late Neanderthal survival after 40 kya. Here we present new radiocarbon dates from Lapa do Picareiro, a cave with about 10m of sediments spanning 50,000 years of the Late Pleistocene. The sequence includes almost 2m of deposits dated between 30–42k cal BP, making it an ideal locale to track the Middle-Upper Paleolithic transition. Level FF, dated 36–38k cal BP, contains diagnostic Middle Paleolithic discoidal core technology, supporting models of late Neanderthal survival in southern Iberia.

Haws, Jonathan [90] see Holst, Melissa

Hawthorne, Paige (Washington State University) and Colin Grier (Washington State University)

[181] *Put a Bird on It! A Multi-analytical Approach to Avian Analysis in Southwestern British Columbia*

Zooarchaeological identifications provide important data related to subsistence changes and the exploitation of past environments. Previous faunal analyses at Shingle Point (DgRv-2), Dionisio Point (DgRv-3), and the Coon Bay/Perry Lagoon (DgRv-6) sites have indicated multiple occupations with important variation in archaeofaunal representation. These locales exhibit a variety of avian fauna, which are not frequently explored in detail within zooarchaeological analyses. We present new osteological data to understand the exploitation of avian species at these sites, which include plankhouse and midden contexts that span the Marpole and Late periods. Through analyzing the avian faunal assemblage, we can understand change over time in resource exploitation across a variety of microenvironments. The results also illustrate how settlement patterns and food acquisition in the southern Gulf Islands involved aspects of landscape construction and modification to enhance resource diversity and abundance.

Hay, Timothy [151] see Skinner, Jane

Hayashida, Frances (University of New Mexico)

[382] *Discussant*

Hayashida, Frances [164] see Killick, David

Hayden, Brian (Simon Fraser University)

[68] *The Secrets in Caves: Use of Caves by Secret Societies*

Caves have been recognized as important prehistoric ritual sites for well over a century. Yet, archaeological discussion of the rituals conducted in caves has rarely gone beyond the platitudes that they were locations for contacting the spirits, invoking powers of fertility, or burying the dead. This paper attempts to place the ritual uses of many caves in a more specific ritual context by documenting the ethnographic ritual use of caves by secret society members and relating this to some prehistoric examples, beginning with the painted caves in Upper Paleolithic Europe. Caves provided ideal locations and environments for special types of secret society rituals. The linking of cave use to secret societies opens up a new dimension of inferences about rituals and the nature of the cultures that supported such organizations.

[211] *Discussant*

Hayman, Nathan [11] see Stanyard, Zachary

Hayne, Jeremy (Independent researcher)

[166] *The Missing Link? Sardinia, Corsica, and Italy and Their Connections in the Late Bronze and Early Iron Age*

The late Bronze and early Iron Age were periods of population movement and change and recent scholarship has highlighted the multidirectional interactions and networks involving the various communities across the whole of the west Mediterranean, as opposed to more static core-periphery models. In Sardinia, for example, this has emphasized the binary relationships between Phoenicians and the local Nuragic communities. With a greater awareness of local networks and connections the regional differences in the island have become more apparent that has come under scrutiny is between Sardinia and central Italy, where scholars have convincingly argued for the active role of Sardinia in these exchanges. However, despite being part of the route between the two locations the role of Corsica remains less well understood. How far did it play a part in the exchanges and how far can 'network thinking' help explain the dynamics of the interactions in this area of the Mediterranean? This paper focuses on the exchanges between north Sardinia and the Italian peninsula, specifically examining the role that Corsica may have played in them, examining the local connectivities at the start of the first Millennium BC.

[166] *Chair*

Haynes, Gary (University of Nevada-Reno) and Janis Klimowicz (Desert Research Institute)

[140] *Clovis-Killed Mammals*

Published opinion pieces about Clovis prey choices are unintentionally misleading. Over 120 individual animals from 8 extinct megafaunal species (or 12, depending upon taxonomy) were killed by Clovis people in a relatively short time span, according to conservative estimates—and the number is even higher in some lists. The 11 Clovis sites said to have acceptable evidence for human predation on mammoths actually contain 50–53 separate individuals, some being discrete kills that should be counted independently; and some are probably also equivalent to discrete short-term camps. In the cold reversals of the Bølling-Allerød warming phase, both extinct and non-extinct megafaunal genera suffered through periods of population fragmentation and reduced genetic diversity, making them more sensitive to environmental stress, but these taxa had also recovered from earlier such periods, suggesting that loss of genetic diversity was not necessarily a precursor of extinction. If Clovis hunting contributed to any extinctions, it was likely through the localized hunting of juvenile and young adult individuals in fragmented populations with low fecundity.

Hayward, Michele (Panamerican Consultants), Frank Schieppati (Panamerican Consultants) and Michael Cinquino (Panamerican Consultants)

[175] *Lesser Antillean Windward Island Rock Art and Prehistoric Cultural Systems*

Two datasets—Jonsson Marquet's proposed chronological framework for rock art of the Windward Islands and Alistair Bright's reconstruction of settlement, sociopolitical and exchange networks within the same region—provide a context for examining the interrelationships among the material cultural correlates (petroglyphs, settlement types, pottery) of various aspects of the area's, as well as inter-area prehistoric cultural components.

Hazard, Rebecca, Christopher Roos (Southern Methodist University), Julie Field (Ohio State University) and John Dudgeon (Idaho State University)**[123]** *Microfossil Analysis of Sediments from a Qaraqara Terrace Site, Viti Levu, Fiji*

Microfossils in archaeology are defined as the floral and faunal-derived microscopic biogenic particles that preserve long after the original organism has died and decayed. Some such examples are silica phytoliths, starches, pollens and spores, calcium oxalates, and plant cellular tissue like trichomes and stomata. This type of analysis is a valuable proxy for inferring prehistoric environmental conditions and landscape change over time, as well as direct evidence for the presence of certain agricultural domesticates and other important subsistence cultigens. In this paper we report some preliminary results of the microfossil analysis performed on sediment samples collected during two excavation field seasons at a site in the Qaraqara drainage, located in the Sigatoka Valley of Viti Levu, Fiji. As part of a collaborative multiyear project, the research presented here seeks to provide vegetation-based evidence surrounding the prehistoric Post-Lapita subsistence transition from foraging to agriculture in the Sigatoka Valley. Specifically, we are interested in addressing questions related to when and how agriculture become the main mode of subsistence at this site, especially in the context of similar research performed at other sites in Fiji and other islands in the South Pacific.

Hazard, Rebecca [123] see Field, Julie

Hazard, Rebecca [123] see Franklin, Olivia

He, Yahui (Institute of Archaeology, Chinese Academy of Social Sciences)**[33]** *Comparison Study of Ceramic Traditions in Neolithic Southeast Mainland China and Taiwan and Their Possible Interaction Modes*

For a long time, scholars have noticed that there are similarities in Neolithic ceramics from Southeast mainland China and Western Taiwan from specific periods. The provenance study adopting XRF (X-ray fluorescence) and ICP-MS (inductively coupled plasma mass spectrometry) of analyzing stone adzes by scholars in recent years demonstrates that people in Southeast mainland China and western Taiwan did interact during the Neolithic dating back to 7450 BP. From these studies, it is known that people transported raw materials from western Taiwan across the strait to mainland China. These studies reinforce the evidence of interaction as early as around 6000 BP. The primary purpose of this paper is to figure out different ceramic traditions and possible types of interaction taking place between Southeast mainland China and Western Taiwan from around 7000 BP to 2000 BP. In this article, the digital microscope is adopted to analyze the paste for the micro-view in order to sort the images of paste to obtain different groups of pastes with hypothesized different compositions based on the geological background of Southeast mainland China and western Taiwan.

He, Yuling [72] see Osing, Natasha

Headrick, Annabeth (University of Denver) and Dorie Reents-Budet (Museum of Fine Arts Boston)**[288]** *The Afterlife in Exile: Butterfly Imagery on Teotihuacán-Style Censers from the Pacific Coast of Guatemala*

The Teotihuacán-style censers from Guatemala have received relatively little attention since the 1980s. Following upon earlier suggestions for a merchant-warrior presence in the Escuintla region, this study examines the butterfly imagery on a group of Teotihuacán-style censers in the national collections of Guatemala. This group of unprovenanced artifacts has research value because (1) its original imagery is intact, and (2) all have been sampled for paste analysis (instrumental neutron activation analysis–INAA). The paste chemistry, combined with archaeological data and stylistic analyses, allow us to recontextualize the censers in terms of interaction among the Pacific Coast sites as well as their external connections. Focused analyses of their intact imagery seek to better understand their social and funerary functions. The censers' emphasis on Teotihuacán warrior and afterlife rituals suggest Teotihuacanos living far from home. Yet their prominent three-mountain motif intimates a connection to mythologized landscapes of both the southern Guatemalan Mayas and their Teotihuacán homeland.

Headrick, Annabeth [182] see Reents-Budet, Dorie

Healan, Dan (Tulane University)**[13]** *Obsidian Procurement, Reduction Technology, and Utilization at Altica*

Technological classification of nearly 30,000 pieces of obsidian recovered from survey and excavation followed by attribute analysis of stratified random samples of some 3,400 specimens reveal several distinct modes of raw material acquisition, reduction technology, and utilization at Altica. The various modes are described from a technological perspective and their various logistical, social, economic, and political implications are considered.

Healy, Paul [267] see Skaggs, Sheldon

Heasley, Kristen [169] see Peresani, Marco

Heath-Stout, Laura (Boston University Department of Archaeology)**[74]** *An Intersectional Study of Authorship and Citation in American Antiquity, Latin American Antiquity, and Advances in Archaeological Practice*

Over the last thirty years, archaeologists studying identity in the past have also examined archaeologists in the present. Feminist archaeologists of the 1990s examined gender inequities among archaeologists using a wide variety of metrics. Since NAGPRA passed in 1991, many have written about the roles of Native Americans and other people of color in archaeological research. Yet there are no studies of how sexism, racism, and heterosexism work together in our field. I will examine patterns of authorship and citation in the SAA's peer-reviewed journals in order to show the demographic composition of Americanist archaeologists producing publishable research. I will test several working hypotheses: that men are overrepresented as compared to women, that white people are overrepresented as compared to people of color, and that straight cisgender people are overrepresented as compared to queer and transgender people. Furthermore, I will test the hypothesis that archaeologists who face multiple forms of systemic oppression (i.e., women of color, queer women, queer people of color) are even less represented in these publications than their counterparts who only face one form of oppression. By using an intersectional feminist lens, I will be able to clearly show the effects of systemic oppression in our discipline.

Hechler, Ryan (Tulane University)**[220]** *Beyond Monumentality: Looking Past the Pyramids of Cochasquí, Ecuador*

The northern highland Ecuadorian site of Cochasquí is one of the country's most respected archaeological resources. Investigations by archaeologists Jacinto Jijón y Caamaño (1910s), Max Uhle (1932), and Udo Oberem (1964–65) had principally focused on this Late Period site's highly visible quadrangular earthen pyramids, which can reach heights of approximately 20 m. The archaeological and public fascination with the visibly monumental has long diverted attention away from between and beyond the pyramids. To ameliorate this research deficiency, the Proyecto Arqueológico Cochasquí-Mojanda was established in the summer of 2016. Long prior to the 1979 creation of a provincial government-administered park to protect the site's pyramids, the earliest archaeological mentions of Cochasquí were about ceramics looted from the site area in the nineteenth century. With the introduction of controlled archaeological investigations, ceramics recovered from the site and surrounding area have demonstrated a regionally diverse political economy, with pottery having origins from the Ecuadorian montañas, Amazon, southern Colombian highlands, and even Inka ceramics as well as Inka-influenced ceramics. Additionally, examples of allochthonous obsidian artifacts have been recovered. Aside from such material, recent research has discovered unique spaces in between and just beyond the pyramids that challenges the previously perceived nature of the site.

[220] *Discussant***[220]** *Chair***Heckel, Claire (American Museum of Natural History)****[138]** *Tracing the Emergence of Pan-Indian Conventions of Dress in the Collections of the American Museum of Natural History*

During the late nineteenth and early twentieth centuries, professional ethnographers/archaeologists and amateur collectors amassed more than 3,000 artifacts of dress and adornment from 17 cultural groups that are now part of the "Plains" collections at the American Museum of Natural History. These objects constitute a material record of conventions of dress that were inconsistently recorded at the time of artifact collection. Drawing on archaeological and ethnographic records, historical documents, and photographic archives, the present study is part of an ongoing effort to recontextualize these objects and to reexamine conventional narratives of culture change and cultural resilience in Great Plains tribes of roughly the 1840s-1930s. This paper presents results of case studies of materials from the Omaha Tribe, the Three Affiliated Tribes (Mandan, Hidatsa, Arikara) and the Cheyenne and Arapaho Tribes. One of the central themes that has emerged in this study is the significance of intertribal exchange and the emergence of a Pan-Indian style of formal dress in the late 1800s. Selected results demonstrate the potential that reanalyses of museum collections have to emphasize native agency and resilience in narratives of culture change, and provide examples of the evidence that emerges with shifting research priorities and renewed approaches to artifacts.

[138] *Chair***Heckman, Robert (Statistical Research, Inc.)****[66]** *Discussant***Hedden, John (University of Iowa) and Daniel Horgen (University of Iowa)****[188]** *The Strange and Terrible Tale of the Davenport Iowa Danish Hall Site: A Lesson in Urban Archaeology from the Farm State*

The Davenport Danish Hall was considered eligible for the NRHP under Criterion A for its "association with the Danish ethnic population in Davenport, and with the history of city politics, specifically the impact of the Socialist Party in the 1920s." This structure was scheduled for demolition to allow for the construction of a new apartment complex as part of the redevelopment of downtown Davenport. As part of the mitigation, a small 30 × 50 ft. parcel behind the structure was scheduled for archaeological inspection. This inspection identified site 13ST323. Though the site contained an intact mid-nineteenth century artifact deposit and features associated with the early settlement of Davenport, the archaeological consultant determined the site not eligible for the National Register. What followed was an unfortunate series of events that occurred prior to review comments being issued by the Iowa SHPO, including the demolition of the structure and construction activities commencing on the site. An after-the-fact mitigation of the site yielded what may be the largest intact deposit of mid-nineteenth-century urban artifacts excavated in Iowa. An amazing turn of events that provides new insight into the economics and lifeways of the mid-nineteenth-century working class of urban Iowa.

Hedenstierna-Jonson, Charlotte (Uppsala University/Swedish History Museum, Sweden)**[15]** *Entering the Viking Age*

Often depicted as a time of local but powerful chieftains, mounted elite warriors and spectacular boat inhumation burials, the Vendel period preceded the Viking Age in Swedish history writing. While contacts with Central Europe and beyond were extensive the societal structure in Scandinavia was still small scale, spread out and built on personal relations. But times were changing and from the mid-eighth century several new features evolve: the emergence of town like structures, changes in scale and organization of the martial aspects of society and most famously the introduction of campaigns outside the Scandinavian homelands; warfare, raids and trade. It is the start of a new phenomenon that we have come to know as the Viking Age. But what do we know about the people that took part in this development and change? Where did they come from? How did they move? By combining archaeological evidence with DNA and isotopic data a more complex image is starting to emerge. This presentation aims at presenting and discussing some of the individuals that took an active part in the process of the eighth century that could be described as entering the Viking Age.

Hedgepeth Balkin, Jessica (University of Colorado, Boulder), Arthur Joyce (University of Colorado at Boulder) and Raymond Mueller (Stockton University)

[82] *Settlement beyond the Alluvial Plains: Recent Findings from the 2016 Río Verde Settlement Project (RVSP), Coastal Oaxaca, Mexico*
 From January–June of 2016, an interdisciplinary dissertation study was conducted in the lower Río Verde Valley, Oaxaca, Mexico which was designed to investigate how prehispanic settlement patterning was affected by environmental productivity. The Río Verde Settlement Project (RVSP) included a continuation of the regional full-coverage survey as well as a systematic sedimentological sampling program to examine regional variation in soil fertility. This paper focuses on the initial results of the survey, which includes promising information for answering two major research questions. First, after environmental changes led to floodplain expansion and estuary formation (c.a. 1800–150 BCE), did settlement concentrate around these resource-rich areas? Second, if people did indeed congregate around the floodplain and estuaries, was there a time lag between the ecological changes and settlement shifts? Preliminary evidence suggests that: 1) more people were attracted to the less productive piedmont and secondary valleys than previously surmised; and 2) a time lag occurred in some resource-rich habitats of the valley before a settlement increase took place. We will explore potential factors behind settlement behind these productive areas, ranging from historical memory of landscapes to variation in agricultural productivity across the lower Verde region.

Hedgepeth Balkin, Jessica [82] see Mueller, Raymond

Hedges, Geoffrey [151] see Ramsay, Jennifer

Hedquist, Saul (University of Arizona), Lewis Borck (Archaeology Southwest and Leiden University) and Alyson Thibodeau (Dickinson College)

[23] *A Colorful Past: Assessing Motivations for the Acquisition of Turquoise in the Ancient U.S. Southwest*

Turquoise is an icon of the U.S. Southwest, long drawing value as a metaphor for moisture in the arid region. As color and material, turquoise is fundamental to the worldviews of many indigenous groups. For the Hopi and Zuni people, the importance and use of turquoise dates back countless generations, to "time immemorial." Continuities in use (e.g., ornamental style and placement in offerings) suggest deep epistemological and ideological affinities; contemporary values are clearly visible in the archaeological record. Our work examines the social uses of turquoise and other blue-green minerals in the late prehispanic Western Pueblo region of the U.S. Southwest. Informed by interviews with Hopi and Zuni consultants, we discuss how contemporary Pueblo uses of turquoise compare to (and oftentimes clarify) archaeological patterns. We assess the geologic provenance of archaeological specimens using measurements of lead and strontium isotopes. With these data, and inspired by social network analysis, we explore the social implications of turquoise exchange in the region by comparing inferred procurement patterns to those of other sourceable materials (e.g., ceramics and obsidian). We hope to provide a more comprehensive and humanistic interpretation of the factors that motivated the circulation and use of turquoise in the ancient Southwest.

Heeb, Bernhard (Museum für Vor- und Frühgeschichte), Alexandru Szentmiklosi (Muzeul National al Banatului Timisoara) and Rüdiger Krause (Johann Wolfgang Goethe-Universität Frankfurt am Main)

[76] *Cornești-larcuri: Ten Years of Research at the Largest Prehistoric Site in Europe.*

The Museum für Vor- und Frühgeschichte der Staatlichen Museen zu Berlin, the Muzeul Național al Banatului Timișoara and the Johann Wolfgang Goethe-Universität Frankfurt am Main, have been investigating the archaeology as well as the landscape context of the Late Bronze Age settlement of larcuri in the Romanian Banat region with the support of the Deutsche Forschungsgesellschaft for the last 10 years. The site is composed of four walled earth and timber enclosures. Its size alone makes the site unique: The total length of all four enclosures is 33 km, and the area encompassed by the walls is about 17.7 km². The investigations of the last 10 years have brought to light completely new insights into the defensive structures and the organization of settlements during the southeastern European Late Bronze Age (ca. 1500 to 1200 BC). However, each new insight throws up a whole variety of new questions, which means that the research is really only in its early stages.

Hefner, Joseph [300] see Bright, Lisa

Hegge, Oliver and Stephen Yerka (University of Tennessee)

[75] *Space Is the Place: Integrating Context through GIS and Geophysical Surveys at Santa Cruz de Tuti, Peru*

The reducción of Santa Cruz de Tuti (AKA Espinar de Tuti) in the Colca Valley is a complex archaeological site in the high Andes with occupational phases representing the Inka, colonial, and republican periods. Multiple geophysical instrument surveys conducted during planning phases, as well as concurrently with a large-scale excavation program in 2016, provided critical information on site use and depositional environment. Spatial, pattern and visual analyses reveal how domestic, public, and ceremonial spaces each suggest differing patterns of site use diachronically and synchronically. Subsurface anomalies of similar character in domestic spaces reveals a cultural pattern that is consistent with ethnographic data and suggests that pre-Spanish traditions were carried on long after Spanish occupation, while public spaces show multiple episodes of landscape modification and re-modification. Both GPR and gradiometer survey were successful for noninvasively locating subsurface cultural features, and test excavations during the 2016 season provided important clues for assessing geophysical survey results across the site. Volcanic sediments and massive fill episodes, however, create a heterogeneous subsurface particularly in the public and ceremonial spaces that impedes anomaly characterization. Integrating geophysical results with the spatial database and ethnographic data contextualizes the geophysical surveys, and provides additional data for spatial analysis.

Hegge, Oliver [75] see Downey, Jordan

Hegmon, Michelle (Arizona State University)

[205] *Discussant*

Heilen, Michael (Statistical Research, Inc.), Jeffrey Altschul (Statistical Research, Inc.) and Friedrich Lueth (German Archaeological Institute)

[224] *Forecasting Climate Change Impacts and Resource Values to Set Preservation and Research Priorities*

Globally, climate change represents one of the largest impending threats to archaeological research and heritage preservation. Rising sea levels and increased storm intensity will cause inundation and erosion of coastal and island resources across the globe. Climate change impacts will increase in their frequency and severity in the coming decades, resulting in compromised integrity or outright destruction of thousands of heritage resources, many of which may never be identified before they are gone. Efforts are needed now to understand the extent of the problem; to identify, record, and save what can be rescued; and to study important resources that will be lost. To set research and preservation priorities, the vulnerability of resources to specific climate change impacts and their relative importance to scientific research, preservation, and other resource values needs to be understood. To this end, we advocate a modeling approach that predicts the location, timing, and severity of climate change impacts; identifies resources at risk, their resource values, and opportunity costs; and prioritizes research and preservation options based on these assessments. We highlight our work with two case studies, one from the Atlantic coast of the United States and one from the Baltic Sea region.

Heilen, Michael [360] see Farquhar, Jennifer

Hein, Anke M. (University of Oxford)

[279] *Soil, Hands, and Heads: An Ethnoarchaeological Study on Local Preconditions of Pottery Production in the Wei River Valley (Northern China)*

This paper approaches ceramic production by combining four aspects of data: geographic background, archaeological find, ethnoarchaeological work, and material analysis. Taking the middle Neolithic site of Yangguanzhai in Shaanxi as a case study, this paper examined the preconditions and processes of pottery making in northern China during the Yangshao Period (5000–3000 BC). Materials from over ten years of excavation and survey at Yangguanzhai and the results of ethnoarchaeological studies in the same region were compared and samples were analyzed using ED-XRF. The results show that potters, both past and present, systematically sought out suitable raw materials, and preferred to work and settle close to clay and

water sources as well as major routes of distribution. A larger scale of production may cause modern potters to use more than one type of clay and include less ideal material, a process which is also visible in the archaeological record. Both ancient and modern potters were specialized, and Yangguanzhai may even have been a specialized production center and not a normal settlement as previously assumed. As this preliminary study shows, such research could go further toward understanding the scale and organization of ceramic production in prehistoric northern China.

[333] Discussant
[213] Chair

Hein, Kendra

[142] *A "Color" Test: Subsistence Practices among Racially Integrated Communities between 1839 and 1890 in the Midwest Region*

Sitting one quarter of a mile from the banks of the Ohio River in New Richmond, Ohio, are the foundational remnants of a nineteenth-century schoolhouse and associated dormitory. The historical and archaeological work of this site are part of an ongoing transdisciplinary project, named for the school, The Parker Academy Project. The college preparatory academy, opened in 1839 by Reverend Daniel Parker and his wife, Priscilla Parker, is the first known documented school in Ohio to accept anyone regardless of race, gender, or religion. Archaeological evidence uncovered at the site, and archival records indicate that residents of the academy lived together in unison sharing daily chores and activities. Foodways during the antebellum and postbellum periods have been well documented on both black and white communities, however, less research has been conducted to discern if foodways continued to reflect individual sociocultural behaviors upon convergence, or if each culture adapted to one another's practices. The methodology in this research is preliminary, but it includes compiling a comparative literature analysis using historic documents, Parker Academy archives, and that from other racially integrated sites between 1839 and 1890. Furthermore, text analysis will be supplemented by cultural materials uncovered from all sites researched.

Heindel, Theresa (University of California—Riverside)

[7] *Ancient Maya Agricultural Techniques: Investigations of Possible Terracing at the Site of Actuncan, Belize*

Recent studies on ancient Maya agriculture address differences in farming methods used within the Maya area, and the implications these differences have for larger issues within Maya studies. Excavations conducted during the Actuncan Archaeological Project 2015/2016 field seasons examined GPR anomalies in the Northern Neighborhood region of the Actuncan, Belize site; the proposed poster will discuss evidence of terracing obtained from these excavations, including how these probable terraces were built, their arrangement within the larger landscape, and their possible role in water drainage and agricultural production. Excavations revealed multiple possible terracing and water drainage systems, including: 1) terraforming to create berms made of yeso, a soil comprised of gypsum; 2) a traditional stone terrace made of limestone and chert cobbles with domestic fill on its western side, reinforcing the terrace from water draining downslope; and 3) short, plastered, sloping walls that appear heavily eroded by water drainage and may have provided water drain channels. These systems may reflect the different ways in which the ancient Maya at Actuncan managed water and agricultural production, as well as address larger issues regarding site spatial distribution and the role of state institutions in the creation and maintenance of agricultural production and landholding.

Heinz, Danielle

[19] *Built on Sand: The Historical Roots of Modern Queerphobia within Christianity*

Homosexuality's place within the church has been a topic of considerable debate among modern theologians. However, most theologians have only focused on homosexuality, disregarding the presence of all other alternative sexual identities and have used only Biblical textual evidence to justify their views on homosexuality. This text contributes a broader scope to the sexuality debate. It considers all queer sexualities, archaeological artifacts, and uses a queer theoretical lens to deconstruct the normalization of queerphobia within Christianity and to propose a new way for understanding the Bible as a source. Because the beginning of queerphobia in Christianity is difficult to trace using the archaeological record, a parallel study in which archaeology can be used to understand the foundation of another prejudice has been considered. This work argues that the emergence of queerphobia parallels the emergence of "false monotheism," including prejudice against polytheism, since both are rooted in misogyny, individual biases, and function to ensure the continuity of the church, unified under one god, Yahweh. Rather than suggesting that these prejudices are justified by God, this article shows how human biases have worked to wrongfully shape Christianity and cause discrimination toward others.

Heitman, Carrie [301] see Field, Sean

Heizer, Melanie (University of Victoria), Kim Kuffner (University of Victoria) and Zoë Deneault (University of Victoria)

[263] *Revealing Lost Inscriptions Using Reflective Transformation Imagery*

Our goal with this project was to identify, assess, and examine what threats exist to graveyard monuments and to explore the functionality of reflective transformation imagery (RTI) as a means for documenting and evaluating monument threats, and illuminate otherwise indecipherable texts and decorative motifs. Our work took place in May and June of 2015, as part of Anthropology 395: Heritage and Historical Archaeology Field Course, as we took part in a survey of the Jewish Cemetery. As part of this project, we highlight some of the threats these monuments are facing, and we use RTI photography to help record, and in some cases, recover inscriptions on the monuments.

Heller, Eric (University of California Riverside) and Anastasia Kotsoglou (Cornell University)

[179] *Desperate Times, Distinctive Places: Human Landscape Interaction at Tzak Naab, Belize*

Located in northwestern Belize, the ancient Maya site of Tzak Naab lay at the intersection of an urban polity and vital agricultural space during the Terminal Classic, a period of considerable ecological and economic stress. The monumental architecture of the site strays from regional grammars with an atypical spatial syntax that emphasizes a connection to an adjacent bajo, a seasonally inundated wetland significant to the regional political economy. Attention to site planning and experiential aspects of place suggest that Tzak Naab served as a nexus for community ritual practices related to agricultural fecundity. By contextualizing the site within the greater political landscape—and critically evaluating the degrees of difference in built environments as well as the object assemblages—this paper demonstrates that localized cosmology is capable of permeating the material milieu. We argue that the idiosyncrasies present at Tzak Naab constitute meaningful and distinctive choices that represent a transformation in the religious and ritual priorities of a community negotiating the anxieties of changing environmental conditions.

Helmer, Matthew (SWCA Environmental Consultants)

[272] *Social Memory and the Reuse of Archaeological Ruins: Preliminary Insights from a Chimú-Inka Elite Gravesite at Samanco, Nepeña Valley, Peru ca. 1470–1534 CE*

Social memory and ancestor veneration are recurring themes throughout Andean belief systems. Yet, the relationship between ancient Andeans and the archaeological ruins they encountered remains an underexplored research topic. Recent fieldwork at Samanco, an Early Horizon coastal settlement in

the Nepeña Valley, shows intriguing mortuary practices of reutilizing site ruins as cemeteries. After an abandonment hiatus over several centuries, Samanco's ruins of stone enclosures were reutilized as a cemetery for local groups. Eventually, site ruins became a burial ground for high ranking members of society, showcased in a spectacular multi-room grave complex excavated in the heart of Samanco. The grave complex dates to provincial Inka rule during the Late Horizon. I will be presenting the rich material contents of the grave, and preliminary evidence suggesting usage of coastal archaeological ruins as venues of social memory associated with ancestor veneration. I suggest the possibility of 'deep' ancestor veneration, linking later coastal populations to apical ancestors through mortuary practices at site ruins. Such practices may have been vital to Late Horizon leadership and coastal identities, after the imposition of the Inkas.

[272] Chair

Helmke, Christophe [267] see Skaggs, Sheldon

Henao, Julian (Simon Fraser University) and Suzanne Villeneuve (Simon Fraser University)

[258] *Advancing the Analysis of Complex Stratigraphy and House Life Histories at Keatley Creek on the Northwestern Canadian Plateau*
Digital methods have led to a new research paradigm in archaeology and have transformed the way in which archaeologists can engage with archaeological contexts or materials and ultimately understand the past. This paper discusses a few highlights resulting from implementing digital oriented methods and combined new conceptual approaches in the research at Keatley Creek on the Northwestern Canadian Plateau. Two primary objectives for digital methods have included improving resolution and understanding of complex stratigraphy, especially in large housepit rim deposits, and correlating various results to help advance stratigraphic interpretations. Primary focus has been on a combination of high resolution imaging and image processing, photogrammetry and GIS techniques for rectifying imagery and spatially analyzing various excavation data. The results emerging from Keatley Creek are helping to demonstrate how significantly different field interpretations can be for complex stratigraphy when a combination of digital approaches are applied in comparison to traditional methods. This has important implications for understanding the formation processes of houses, monitoring changes over time, interpretations of house life histories and extending this to reconstructing entire site or regional chronologies. These new developments are providing significant advantages in how we understand early cultural developments and hunter-gatherer adaptations on the Canadian Plateau.

Henderson, A. Gwynn (Kentucky Archaeological Survey) and Linda Levstik (University of Kentucky)

[97] *Investigating a Shotgun House: Piloting a new Project Archaeology Shelter Investigation*

"Investigating a Shotgun House" draws on diverse data sources to examine the lives of poor, mid-twentieth-century working-class people in Davis Bottom, a historically integrated neighborhood near downtown Lexington, Kentucky. Piloting drafts of the investigation were integral elements in its development. A weeklong teachers' academy provided revisions to the draft, which was then piloted by four 5th–7th grade teachers who had attended the academy. Feedback from interviews with both teachers and students shows that the investigation provides a rich, inquiry-based learning experience. Teachers could make clear links to their mandated curriculum, and students enthusiastically embraced the unit. Unanticipated outcomes included the lack of time which prevented most teachers from teaching the preservation thread of the unit, the way the students identified with the Davis Bottom residents and aspired to live in a racially diverse neighborhood, and the unit's relevance for challenging students to consider broader themes such as civil rights, economic inequalities, and the uses and abuses of power.

Henderson, A. Gwynn [396] see Pollack, David

Henderson, Cory A. (Department of Anthropology, University of North Carolina at Greensboro), Ryan M. Byerly (Far Western Anthropological Research Group), Cynthia M. Fadem (Department of Geology, Earlham College), Curran Fitzgerald (Department of Anthropology, University of North Ca) and Charles P. Egeland (Department of Anthropology, University of North Ca)

[305] *Patterns of Hominin Land Use and Raw Material Procurement in the Paleo-Olduvai Basin, Tanzania*

Suitable toolstone was a key affordance for Early Stone Age (ESA) populations across Africa. Northern Tanzania's Olduvai Basin, because it contains numerous ESA archaeological localities and a variety of quartzitic outcrops, offers an excellent opportunity to evaluate the effect of raw material distribution on hominin land use. While the lithology and mineralogy of these outcrops have been well described, their macroscopic similarities confound efforts to reliably determine the exact source of quartzite artifacts. Here, we provide quantitative geochemical data that (1) statistically distinguish three of the Basin's quartzite outcrops, and (2) probabilistically identify the origin of a sample of artifacts from several of the Basin's important ESA lithic assemblages.

Henderson, Lucia (Denver Art Museum)

[182] *Changing Faces: Evolutions in Art at Kaminaljuyu, Guatemala*

The site of Kaminaljuyu experienced intensive ideological and material cultural change from the Preclassic through the early Classic period. Certain artistic forms and ideological precepts, however, simultaneously demonstrate remarkable continuity. This talk focuses specifically on public messages communicated through stone sculpture as well as, to a lesser degree, messages communicated by elite and royal funerary contexts in order to access continuity and change in Kaminaljuyu's archaeological and art historical record. This talk argues that shifts in elite material culture and public art reflect efforts by the Kaminaljuyu elite to communicate their participation in shifting ideological, political, and economic marketplaces over time. While many underlying ideologies remain consistent, one finds dramatic changes in how these messages are communicated through public art and elite funerary contexts through the centuries. One of the most important factors in recognizing and analyzing these developments is the recent identification of an indigenous sculptural tradition, native to the Southern Region, which arose after the Olmec style fell out of favor. Since this locally developed style articulated locally relevant messages, it provides scholars with a baseline, highlighting the ways in which these messages and the format of their presentation changed through time.

Hendon, Julia (Gettysburg College)

[5] *Fine Dining and Social Position among the Classic Period Maya and Their Neighbors in Honduras*

Drawing on the substantial body of information that has accumulated over decades of research on the kingdom of Copan and its southern and eastern neighbors, I address the question, What were the key components of Maya meals that turned dining into an important, flexible, and subtle way to embody status? This paper draws together information from a range of methods and bodies of data including ethnobotanical and archaeozoological studies, chemical analyses, research on human skeletal remains, visual imagery, text, artifacts, and architecture. No one approach can answer the question posed in this abstract but collating the many specific studies may provide a way to construct a more complete picture of the relationship between Maya cuisine (including such topics as what was served, how, and when) and social identity, including class and gender, as well as political authority.

[80] *Discussant*

Hendrickson, Mitch (University of Illinois at Chicago), Stephanie Leroy (Laboratoire Archéomatériaux et Prévision de l'Alté), Enrique Vega (Laboratoire Archéomatériaux et Prévision de l'Alté), Quan Hua (Australian Nuclear Science and Technology Organisa) and Philippe Dillmann (Laboratoire Archéomatériaux et Prévision de l'Alté)

[323] *The Industry of Empire: Investigating the Spatial and Technological Organization of Angkor Iron Production around Phnom Dek, Cambodia*

Intensive surveys around Phnom Dek, the "Iron Mountain," in central Cambodia have revealed the presence of a massive iron production landscape dating between the ninth and twentieth centuries. Using a combination of site morphology, spatial distribution, field pXRF analysis and in-slag radiocarbon dating this paper attempts to reconstruct these industrial-scale iron smelting practices with particular emphasis on the Angkorian period (ninth to thirteenth c.). The results will inform on the localized technological systems at work around Phnom Dek and contribute to the broader question of how iron enabled the expansion of Angkor across medieval mainland Southeast Asia

Hendrickson, Mitch [29] see Fischer, Christian

Hendy, Jessica (Max Planck Institute for the Science of Human History)

[96] *Taxonomic and Tissue Specific Dietary Proteins in Pottery Residues*

Ceramic vessels are abundant in the archaeological record as one of the surviving remnants of past food preparation and consumption. Organic residue analysis has been widely applied to determine the use of ceramic vessels, with approaches typically focusing on the recovery of lipids. Here we present a novel method for extracting dietary proteins from pottery residues using LC-MS/MS and report the detection of tissue-specific dietary proteins down to the species level. Using this approach, we were able to extract proteins from limescale deposits on sherds from Early Chalcolithic Çatalhöyük West in Anatolia and identify peptides from milk products, cereal grains and peas at high confidence. These results demonstrate the versatility of shotgun proteomics for detecting different foodstuffs within the same analysis, often with a high degree of tissue and species specificity.

[96] *Chair*

Henebry-DeLeon, Lourdes

[315] *Discussant*

Hennius, Andreas (Department of Archaeology and Ancient History, Uppsala, Sweden)

[15] *Viking Age Tar Production and the Exploitation of the Outlands*

In Sweden, recent excavations have revealed how the production of tar evolved from a small scale, household operation situated within the settlements of the Roman Iron Age, to a large-scale activity in the forests during the Vendel and Viking periods. The resulting quantities of tar far exceeded ordinary household requirements. This change in production coincides with the introduction of the sail, characteristic for the Viking Age, with extensive need for large amounts of tar. The change in character of tar production follows a pattern seen in many other handicrafts during the same period, with an intensification of production beyond the farmsteads and exploitation of areas such as forests, coastal zones or mountains—what in Swedish is termed "Utmark"—the Outlands. In addition to reviewing this tar production, the paper will discuss the exploitation of the outlands, with their vast reserves of raw materials. I argue that the increased outland use can be seen as a new way of organizing society, managing labor, the landscape and its natural resources. This resource colonization is suggested to be of major economic importance and fundamental for the understanding of social development during the Viking age.

Henrikson, Steve and Janice Criswell (Weaver)

[138] *The Resurgence of Geometric-Patterned Regalia on the Northern Northwest Coast*

Regalia woven using the "Chilkat" technique appeared on the northern Northwest Coast in the early nineteenth century, apparently replacing an older tradition of regalia decorated with geometric patterns. Only a dozen of these early robes (or archaeological fragments thereof) remain in museums. In the late 1980s, weaver and scholar Cheryl Samuel studied these survivals, documented them in great detail, and developed curriculum to teach these techniques to weavers, who since that time have created hundreds of ceremonial robes and other regalia in the geometric style—now known as "raven's tail weaving." Today, "raven's tail" regalia is worn for all manner of traditional ceremonies, alongside Chilkat robes and button blankets. This presentation will cover some of the highlights and issues surrounding the resurgence of "raven's tail," including the analysis of robe fragments recovered archaeologically, ethical issues raised by the reintroduction of a "lost" art form, and cultural appropriation, given the involvement of non-Native weavers in the repatriation of knowledge.

Henry, Edward (Washington University in St. Louis), George Milner (Pennsylvania State University) and Natalie Mueller (Washington University in St. Louis)

[163] *There and Back Again: Dick Jefferies, Winchester Farm, and Middle Woodland Interaction across Central Kentucky*

Adena-Hopewell enclosure complexes have inspired much conjecture and some well-supported inferences concerning the rise of Middle Woodland ceremonialism, interaction, and social organization in the Eastern Woodlands. After examining Hopewellian interaction at Tunacunnee in Northwest Georgia, Dick Jefferies turned his focus to Adena-Hopewell mound and enclosure sites in Central Kentucky. Dick's examination of the Winchester Farm Enclosure in the early 1980s with George Milner was the first research on this little-known earthen enclosure within the Mount Horeb complex. His direction of a geophysical survey with Edward Henry at the site in 2009 led to its discovery as the only known "squirrel" in Kentucky, an enclosure form common in the Ohio Hopewell heartland and elsewhere. Recent excavations at Winchester Farm included a trench through its ditch and embankment, as well as an area inside the enclosure. Construction methods are comparable with other enclosures in the Mount Horeb complex, but the site was used differently. Here we put the construction, use, and abandonment of this enclosure in a larger cultural and temporal context. The chronology of Winchester Farm calls into question culture historical constructs like "Adena" and "Hopewell," and suggests Middle Woodland interaction in the Kentucky Bluegrass occurred longer than previously thought.

Henry, Edward [29] see Frachetti, Michael

Henry, Margaret

[361] *Discussant*

Henry, Shea (Simon Fraser University)**[395]** *Contact and Colonial Impact in Jamaica: Comparative Material Culture and Diet at Sevilla la Nueva and the Taino Village of Maima*

In June 1503, Columbus and his two battered ships were run aground in the sheltered harbor of St. Anns Bay Jamaica, 1.4 km from the Taino village of Maima. After spending a year marooned there, the Spanish left with the knowledge of the people and resources of the area. Six years later, in 1509, the Spanish returned to found the Jamaican colonial capital of Sevilla la Nueva. By the time Sevilla la Nueva was abandoned in 1534, Maima was deserted. Historical records kept by the colonists indicate that the villagers were brought to the colony and made into laborers and wives. The material culture and dietary practices at Sevilla la Nueva reflect this through the presence of colonoware and Taino adapted European goods. At Maima, very few adapted European goods and remains of domesticated animals were found. This, and the presence of traditional material culture and diet throughout the site, indicates continuity of a traditional way of life until their final act of resistance, abandoning Maima. This paper will discuss the adapted European/Taino material culture and faunal remains found at both Sevilla la Nueva and Maima, illuminating, in some way, the ultimately devastating impact of contact and colonialism.

Henshilwood, Christopher [354] see Haaland, Magnus

Hensler, Rachel (University of Kentucky)**[163]** *Native American Interaction during the Spanish Contact and Mission Period on the Central Coastal Plain of Georgia, USA, AD 1540–1700*

This paper examines how interaction between Native American groups living in areas of indirect contact changed during the Spanish colonization of the southeastern United States. The project area, the Big Bend Region of the Ocmulgee River Valley in the central coastal plain of Georgia, had ties to the Spanish mission region in both prehistoric and historic periods, though there was little direct interaction between Spanish missionaries and Native Americans. Using technological style as a theoretical backdrop, I demonstrate how interaction changed through time by defining the step-by-step sequence of ceramic production, from clay selection to final decorative attributes. Results show that the production sequence changed through time in the region and decorative attributes suggest increasing contact with groups living in coastal Georgia, where there was a string of Spanish missions. Though interaction with other groups may have changed, the potters of Ocmulgee Big Bend remains a relatively cohesive potting group despite the changing world around them, as the effects of European colonization spread through the southeastern United States.

Heo, Jina (University of Wisconsin-Madison)**[333]** *Early Urban Configurations in Mahan, Korea: Local and Regional Approaches to Settlements dated to 100 BCE–CE 300*

Mahan, composed of 54 polities in central and southwestern Korea, grew rapidly from 100 BCE to CE 300, by which time it covered about 40,000 km², with a population of roughly 500,000. During much of this time, urban zones became the dominant residential mode at both local and regional levels, but without suggesting a strong central authority. No unequivocal capital cities have been identified. At the same time, there is evidence of a dual-urban organization with distinctive functions in terms of social networks, economic activities, and political opportunities led by socioeconomic diversity between the Mahan polities. The local urban centers surrounded by elites' cemeteries, which were bounded with identical forms of pottery and houses, were mostly formed in agricultural sustaining areas. On the other hand, the regional urban centers represented different social groups and craft activities of iron and bead working, concentrated in the location of possible nodes in wider regional and transregional transportation networks with relatively dense population and prolonged persistence. Urban centers in Mahan may have developed at both local and regional levels, serving different functions because of a high level of economic interdependence between a variety of economic and social groups.

Hepburn, Joseph (Simon Fraser University), Brian Chisholm (University of British Columbia) and Michael P. Richards (Simon Fraser University)**[258]** *Isotopic Perspectives on Spatial and Temporal Variability in British Columbia Paleo-diet*

This study aggregates and reevaluates all available stable isotope data from archaeological human remains in British Columbia. Isotope signatures for coastal individuals correspond well with the heavy marine specialization attested to by archaeological and ethnographic studies of traditional Northwest Coast diets. Within this marine specialization, the data for coastal BC demonstrate a high degree of regional dietary variability, although high trophic level marine prey species are of ubiquitous importance. No large-scale temporal shifts are present in coastal diets, with consistent carbon and nitrogen δ -values across the entire timespan represented. Despite the near universal marine specialization, notable outliers exist throughout the coast, with three individuals' fully terrestrial diets contrasting significantly with regional dietary patterns. In the BC interior diets are much more variable, representing a range between purely terrestrial to mixed marine (anadromous fish) and terrestrial. Along salmon-bearing rivers, the apparent marine component of diet is positively correlated with downstream proximity to the ocean.

Hepp, Guy (California State University, San Bernardino)**[357]** *Evidence for the Emergence of Social Complexity in Early Formative Period Coastal Oaxaca, Mexico*

The emergence of sociopolitical complexity, and its connections to other developments such as changing subsistence and domestic mobility, has been a central theme of archaeology for over a century. Mesoamerica has been no exception to this trend, and scholars of precolumbian Mexico and Central America have scrutinized socioeconomic correlates of changing political integration and centralization. One concept central to this research has been that of hereditary hierarchical inequality. In fact, ancient societies are often considered complex on the basis of producing evidence for such hierarchies. Even as incipient inequality has been traced further back in time in parts of Mesoamerica (to the Early Formative period [2000–1000 BCE]), questions remain regarding how ostensibly "egalitarian" groups became "transegalitarian," or began shifting toward permanent inequalities. In this paper, I join a few other researchers in arguing that heterarchical distinctions were foundational to Mesoamerican complexity. I present iconographic and mortuary evidence from the Oaxacan site of La Consentida, one of the earliest known villages on Mexico's Pacific coast. I conclude that distinctions in attire and in specialized knowledge evinced at La Consentida suggest one avenue through which egalitarian peoples laid the foundation for the famous complex civilizations of later Mesoamerican history.

Hepp, Guy [82] see Joyce, Arthur

Herbert, James (Stantec Consulting Ltd.) and Sean Connuaughton (Inlailawatash LP)**[394]** *Exploring "Helicopter" Consulting*

Large-scale cultural resource management on the Northwest Coast stands at the crossroads among resource development, for-profit resource management, and Indigenous control and consent. Recent legal cases, specifically in British Columbia, highlight the need for consultants, industry and Indigenous governments to plan for future development together. This paper follows a line of inquiry from our previous work, exploring how the "fly in, fly

out" nature of consulting practices alienates consultants from the communities they work in, and with, and inhibits a true understanding of the impact of consultation on these communities.

Heredia Espinoza, Verence Y. (El Colegio de Michoacán) and Christopher Beekman (University of Colorado, Denver)

[322] *Confronting Conflict in the Tequila Region: Spatial Configurations in a Bellicose Landscape*

During the Late Postclassic, the Tequila region was home to multiple small, ethnically, and linguistically diverse polities, which both competed and cooperated with one another. This period was highly conflictive due to attempts by the Tarascan Empire to push its way into the valleys, wreaking havoc in several towns along the way. To the north, bellicose, nomadic groups were also a threat to Tequila's population. Therefore, we hypothesize that Late Postclassic settlement patterns reflect this conflictive political milieu. We evaluate this hypothesis by investigating possible internal and external boundaries and how they relate to conflict. We also consider the degree to which the Tequila region's geomorphology, which included valleys, mountains, canyons, and lakes, figured into boundary strategies.

Heredia Espinoza, Verence Y. [179] see Beekman, Christopher

Heredia Espinoza, Verence Y. [215] see Cardona Machado, Hector

Heredia Espinoza, Verence Y. [215] see Marino, Marc

Herhahn, Cynthia [129] see Huntley, Deborah

Hermes, Taylor (University of Kiel), Michael Frchetti (Washington University in St. Louis), Paula Doumani (Nazarbayev University), Ekaterina Dubyagina (Institute of Archaeology Kazakhstan) and Cheryl Makarewicz (University of Kiel)

[290] *Substantial Intensity of Millet Agriculture During the Bronze and Iron Ages in Kazakhstan Is Revealed in $\Delta 13\text{C}$ and $\Delta 18\text{O}$ Time Series of Incrementally Sampled Livestock Teeth*

This paper presents carbon and oxygen isotopic values incrementally sampled from mandibular molars of domesticated livestock from pastoralists sites in eastern, central, and northern Kazakhstan with Bronze and Iron Age occupations. The intra-tooth patterning of $\delta 13\text{C}$ and $\delta 18\text{O}$ values are used to characterize millet consumption from foddering and grazing on stubble in harvested fields. Results indicate that some animals were seasonally consuming large proportions of C4 plants as early as 2400 cal BC. Seasonal variation in diverting this resource to animals is observed across sites and into the Iron Age. This finding elucidates the scale of millet consumption by livestock and builds upon paleobotanical documentation of inhabitants of the sites using domesticated grains. Evidence for limited access to high-elevation pasturage and the seasonality of stress marked by tooth enamel hypoplasias that formed during the harsh winters indicate that pastoralists likely required or, at least, preferred subsistence strategies that depended on farmed grains. This finding suggests that Central Asian pastoralists had an intimate relationship with intensive agriculture and might have been relatively sedentary.

Hermes, Taylor [29] see Frchetti, Michael

Hermitt, Elijah J. (Pennsylvania State University) and Kirk French (Pennsylvania State University)

[7] *The Palenque Pool Project: An Energetic Analysis of Monumental Construction Costs*

The Palenque Pool Project began excavations of the largest pool of the Picota Group in the Classic Maya site of Palenque in 2014. This group is located 1 km from the Palace on the western edge of the site. Although the function of the pool is still unknown, its placement adjacent to one of Palenque's two stelae and its similarity to modern Maya examples, suggests ceremonial use. Prior research shows that a laborer could transport 586 kg of limestone per five-hour person-day from the determined source quarry to the location of the pool. These rates can then be applied to the total volume of stone used to construct the pool to estimate the number of person-days each process would require. The goal of this project is to quantify the energetic rates of quarrying, stone manufacture, and assembly in an effort to build a comprehensive monumental construction cost analysis. While analyses of this type have been done at other Maya sites, this approach has never been applied to any structure at Palenque. Future research will seek to add an ethnographic energetic comparison of the modern Maya people of Chamula, who also utilize an analogous system of sacred pools.

Hermitt, Elijah J. [243] see Gentil, Verna

Hernández, Cesar Valentín [135] see Punzo, José Luis

Hernandez, Christopher

[187] *Walls, Ditches and Spoil: Methodological Issues in the Study of Precolumbian Fortifications*

A critical facet of studying past warfare is the analysis of fortifications. Fortifications are often visible on the surface, making these archaeological features identifiable through surface reconnaissance. Moreover, test pits and trench excavations into gated areas or across various sections of fortifications can be used to establish the martial functions of these archaeological features. Yet, the study of past warfare and fortifications often stumbles in the interpretive stage. How do we know a feature is a fortification? Cross-cultural models provide an important framework for archaeologists to identify fortifications across time and space. Nevertheless, general principles derived from cross-cultural studies must be complimented by the specifics of the cultural context(s) under study. By combining cross-cultural models with ethnographic, ethnohistoric and archaeological data from the Maya area, I examine potential fortifications at the site of Tzunun, Chiapas, Mexico. Tzunun is a settlement that contains potential fortifications in the form of free-standing walls, retaining walls, a trench and mounds of earth. My analysis highlights that fortifications deserve greater attention, not merely as indicators of warfare, but as complex archaeological features—similar to households, markets or temples—that had a variety of functions.

[187] *Chair*

Hernandez, Hector (Universidad Autonoma de Yucatán), Soledad Ortiz (Universidad Nacional Autonoma de Mexico) and Jose Luis Ruvalcaba (Universidad Nacional Autonoma de Mexico)

[349] *Chemical Residues Analysis and Infrared Spectroscopy to Determine a Kiln's Function from a Henequen Hacienda in Yucatán, Mexico*
 San Pedro Cholul was a henequen plantation and industrial facility, a hacienda estate, situated on the northeastern part of Merida city, Yucatán, México. Its principal development was during the last decades of the nineteenth century, known as Yucatán's Gilded Age, and it was totally abandoned by the middle of the twentieth century. In 2015 we excavated a kiln facility in order to confirm its function as a lime production structure, to obtain archaeomagnetic dates, and to extract sediment samples for laboratory analysis. Our goal was to distinguish the lime productive procedures, following a methodology developed by Chu et al. (2008) and Regev et al. (2010). Through chemical and physical sediment analysis and infrared spectroscopy we were able to calculate the exposure temperatures of limestone materials and identified the presence of ash and lime production splinters on the kiln sediments. We hypothesize that the owners of San Pedro Cholul were using these standardized construction materials on principal buildings, like the main house and the chapel. This study was also relevant to understand the adoption of lime technology, the production processes, and the usage of lime in the context of a henequen fiber production settlement at the dawn of the twentieth century.

Hernandez, Valeria [225] see Sanroman, Adriana

Hernandez Espinoza, Patricia (Centro INAH Sonora)

[183] *Los atributos de la identidad el caso de Tamtoc, San Luis Potosí, México*

La ritualidad de los grupos humanos está íntimamente ligada a su cosmovisión, a su organización social, así como con aquellos elementos que les otorgan identidad. Las modificaciones corporales que se han estudiado tradicionalmente en la antropología física, como son la modificación intencional el cráneo, el limado dental, la lesión suprainiana y la trepanación, deben ser consideradas como expresión de los elementos antes mencionados. El significado de cada una de ellas solo puede ser entendido cuando comprendemos que su presencia en restos esqueléticos no es al azar ni para otorgarse atributos estéticos, sino que cada modificación fue hecha para dejar rastros de la identidad del individuo que las portaba. La discusión del enfoque metodológico del "embodiment," como propuesta interpretativa y explicativa de la presencia de las modificaciones culturales, es el objetivo de esta ponencia utilizando como telón de fondo los hallazgos de los últimos años en el sitio arqueológico de Tamtoc y asentamientos aledaños.

[94] *Chair*

Hernandez Garavito, Carla (Vanderbilt University) and Carlos Osore Mendives (Pontificia Universidad Católica del Perú)

[331] *The House that Built Me: Local and Nonlocal among the Lurin Yauyos during the Inka Empire*

Most scholarship on the shifts in local lifeways during the Late Horizon strictly focused on changes in the availability to new and limited-access goods by local elites (D'Altroy 2001; Hastorf 1990; 2003). In these models, local leaders became immersed in reciprocal and status-granting relationships with the Inka through gifts and exclusive artifacts. Materiality played a pivotal role in the relationship between the Inka and their subjects. However, it is less clear how local ethnicity was shaped by materiality during this period. Recent scholarship demonstrates that the Inka reorganized local groups into new ethnic identities that better suited the ideal of unified provinces brought together into a cohesive imperial structure (Ogburn 2013). Even though the incorporation of smaller polities into Tawantinsuyu broadened local networks, local goods and technologies remained central to daily life. In this presentation, we question how ethnicity was formed, maintained and expanded through materiality among the Lurin Yauyos of Huarochiri. Through excavations in two households in the site of Ampugasa, and building primarily on architectural, ceramic, and zooarchaeological information, we argue that while the Inka fostered a Lurin Yauyos ethnic identity, it remained defined from the ground-up by the internal sociocultural mechanisms existing among the Yauyos groups.

Hernández Morales, Zurisadai (Universidad Veracruzana) and Michael L. Loughlin (University of Kentucky)

[320] *Documentando la Destrucción de Montículos con Detección Remota*

En 1965 Michael Coe opinó que el sur de Veracruz constituía una de las zonas arqueológicas más ricas del mundo, en donde se podía manejar por 11 km en el camino entre Ángel R. Cabada y Lerdo de Tejada "y nunca dejar de ver montículos." A partir de 2014 el proyecto RRATZ ha documentado numerosos asentamientos y elementos arquitectónicos en esta región, La configuración actual de los asentamientos, incluyendo aquellas cuestiones específicas como dimensiones, orientación, número y disposición de elementos, así como el estado y las condiciones en las que son hallados son cuestiones que proporcionan a su vez información indispensable en la investigación de patrones de asentamiento y cambios sociopolíticos. Sin embargo, nuestra investigación ha identificado un alto grado de destrucción, especialmente en el área citada por Coe. Se documentaron aquellos asentamientos identificados a través de distintos métodos, algunos localizados en los recorridos de superficie y otros más por medio del estudio asistido de alta resolución de Laser Imaging Detection and Ranging (lidar). Comparamos los datos obtenidos recientemente con los identificados en el Recorrido Arqueológico de El Mesón (RAM) y fotos aéreas históricas para estimar la extensión y el ritmo de destrucción de sitios prehispánicos en la región.

Hernández Uribe, Wanda (Dirección de Registro Público de Monumentos y Zonas Arqueológicas e Históricas)

[328] *Registration of Movable Historical Nature in the Public Registry of Monuments. Advances and Challenges*

As a result from the restructuring and updating of the Public Registry of Monuments and Archaeological Areas, attention that was traditionally given to the broad nature of mobile, prehispanic or archaeological goods, is incorporated formally to the Public Registry as well as the complex universe of historical assets, which from a legal scope covers—practically—from the sixteenth to nineteenth centuries. This paper summarizes the progress achieved to date and the challenges we might face in an immediate future. The discussion results from an unprecedented institutional effort and from improving practices around the cataloging and registration of historical mobile monuments, resulting in the protection and documentation of the cultural heritage sector in Mexico.

Herr, Sarah (Desert Archaeology, Inc.), Maren Hopkins (Anthropological Research, LLC), TJ Ferguson (Anthropological Research LLC) and Vincent Randall (Yavapai-Apache Nation)

[106] *Pragmatism and Power: Considerations of Western Apache Reuse of Archaeological Sites*

Western Apache and archaeologists have often commented that Apache avoid archaeological sites for all but ceremonial purposes. Yet, the distribution of Western Apache site components in central Arizona shows that until the late nineteenth-century Western Apache often reused earlier sites as residences and for resources. Elders from the Yavapai-Apache Nation and the White Mountain Apache Tribe interpret these patterns as expressions of their ancestors' pragmatism and their changing power in the face of American colonialism.

Herrera, Roberto (Hunter College CUNY) and Francisco Corrales (Museo Nacional de Costa Rica)

[360] *Navigating Global and Local Attitudes Toward Heritage Initiatives in Southern Costa Rica*

This paper explores the dynamic between local and foreign perceptions toward cultural and environmental exploitation and stewardship, presenting recent reactions to medium to long term initiatives that have been started by national and international institutions in southern Costa Rica. It reviews how

researchers are attempting to better integrate themselves with local communities and national organizations in a more sustainable and responsible manner, presenting the current challenges encountered while trying to implement a bio-cultural tourism and education model in the Osa Peninsula of Costa Rica. The variable acknowledgement of precontact cultural resources and environmental corridors, tension between what is often perceived as foreign versus local priorities, and differing attitudes within Costa Rican society are central to understanding the range of meaning among multiple stakeholders. Using the Osa region as a case study, the paper reviews the multivocal definitions of heritage, identity and landscape that have produced varying levels of cooperation, collaboration as well as tension and resistance. Addressed within a general historical ecological approach, it summarizes the evolving nature of research and conservation methodologies and its implications for global and local economic and cultural interactions.

Herrera Malatesta, Eduardo (Universiteit Leiden)

[158] *Contrasting Worldviews in Hispaniola: Places and Taskscapes at the Age of Colonial Encounter*

Landscape has been a useful analytical tool for archaeologists for a long time. Its definition since its first uses in the discipline has grown and diversified to the point that it has been called a "usefully ambiguous" concept. However, this broad definition should not be applied everywhere and in every temporal/historical context. This concept should not be used as a straightforward analytical tool, but requires a critical contextual revision. For an alternative approach in the area of this research, I am using Ingold's concept of taskscape and place to analyze and interpret the conflicting relations between the indigenous population of Hispaniola island and the Spaniards as a result of the beginning of colonization after 1492. Moreover, when relating Ingold's concept of taskscape with Descola's symbolic ecology with particular reference to his notion of mode of identification, the resulting theoretical frame allowed to compare the different worldviews from these groups at this specific historical period. This paper will present the first results of this theoretical exploration, particularly the indigenous and Spaniard intentionality behind their own spatial patterning in relation as well with material culture and the environmental context.

[93] *Discussant*

[158] *Chair*

Herrick, Hannah (University of Arizona)

[124] *Building at Bac: Chronological Challenges in Conservation at Mission San Xavier*

Traces of early modern European presence in the Sonoran Desert endure today as plaster-white mission churches dotted across the arid landscape. Established by Jesuits as early as AD 1691, Mission San Xavier del Bac in Tucson, Arizona is unique in its continued usage as a modern Catholic church. Its long-standing occupation necessitates nearly-constant conservation practices, which must be complementary to the church's original construction. However, the absence of nearly two-hundred years' (AD 1691–1864) worth of church records consigns the information regarding the mission's early building and repair history to a few oblique textual references and sporadic, modern archaeological sampling. Coupled with multiple building phases and sometimes ambiguous construction methods, assumed biographies of the structures seen today are incredibly convoluted. As recently as January 2015 and August 2016, foundations near the East Tower exposed during routine restoration have revealed inconsistencies with the fragmented early historical records. Solidifying a building chronology for this beautiful, historic mission church has become paramount in addressing difficulties in conservation practice, especially as restorative work on the mission foundations becomes more necessary. In particular, dendrochronological analysis of reused timber in the southern convento wing may attach the church's early history to a calendar date.

Herrmann, Corey (Yale University)

[220] *Tabuchila Ceramics of the Jama River Valley, Manabí, Ecuador*

Archaeological excavations by the Proyecto-Paleoetnobotánico Río Jama (PAPRJ) in the Jama River Valley of northern Manabí, Ecuador, have established a cultural chronology spanning over three millennia of prehispanic occupation. One of these occupations, the Tabuchila Complex of the Late Formative Period (1000–500 BC), remains poorly understood. Excavations at three sites in the Jama Valley in the 1990s recovered ceramic, lithic, obsidian, paleobotanical, archaeofaunal, and human skeletal remains from Late Formative Tabuchila contexts, with the goal of orienting Late Formative occupation of the northern Manabí region to its contemporaries in western lowland Ecuador. This study employs a methodology of modal ceramic analysis to recognize and catalogue formal and stylistic variation within the recovered Tabuchila ceramic assemblage. Through this analysis the Tabuchila assemblage is compared to other studies of Middle and Late Formative culture, to understand how Tabuchila represented a regional variant of and contributor to the formation of the Chorrera ceramic tradition.

Herrmann, Jason [241] see Thornton, Taylor

Hershkovitz, Israel (Tel Aviv University), Bruce Latimer (Case Western Reserve University), Hila May (Tel Aviv University), Rachel Sarig (Tel Aviv University) and Ofer Marder (Ben Gurion University)

[338] *Manot 1 Brain Characteristics*

Manot is a nearly-sealed, active karstic cave located in the hilly landscape of the western Galilee, Israel. It contains abundant archaeological accumulations attributed to the early phase of the Upper Paleolithic (UP) period as well as evidence for the Middle Paleolithic (MP). During the initial survey of the cave (2008), a nearly complete calvaria (Manot 1) was found. The specimen was dated to ~55 ky by the U-Th method. In an earlier study, Hershkovitz et al 2015 described the morphometrical characteristics of the calvaria and discussed its possible taxonomy and populations' affinity. The present study focuses on the Manot 1 endocranial features and the brain endocast traits and compares them to contemporaneous and modern brains in order to shed light on brain evolution during the last 50 ky.

Hershkovitz, Israel [338] see Barzilai, Omry

Hershkovitz, Israel [338] see Sarig, Rachel

Hertfelder, Paula (Binghamton University)

[301] *A Spatial and Predictive Model of Archaeological Sites on the Lincoln National Forest*

The Lincoln National Forest has produced a wealth of GIS data on archaeological sites in Southeastern New Mexico. This data has not yet been analyzed. This poster presents a predictive spatial model of archaeological sites on the Lincoln National Forest to provide information on the interaction between people and the environment and the changing use of the landscape over time. In this project, I have developed a predictive model of archaeological sites based on a statistical analysis of environmental variables and test it by withholding a sample of sites. I also examined the distribution and density of archaeological sites relative to geographic and environmental factors, site distribution and density over time, as well as the

changing use of the landscape of the Lincoln National Forest. As southeast New Mexico is a region often overlooked in archaeological research, this project represents an important preliminary exploration of spatial data in the region.

Herzka, Sharon [142] see Fonseca Ibarra, Enah Montserrat

Herzog, Nicole [282] see Parker, Christopher

Hess, Erin

[351] *Mitigation of the Alder Creek Mining District, Sacramento County, California*

The mission of the U.S. Army Corps of Engineers' (Corps) Regulatory Program is to protect the Nation's aquatic resources while allowing reasonable development through fair and balanced permit decisions. The Corps consults with permit applicants and other consulting parties, in a collaborative effort, to develop appropriate mitigation measures when adverse effects to historic properties cannot be avoided. A new development was proposed that would adversely affect the National Register of Historic Places-eligible Alder Creek Corridor Mining District (ACCMD), a historic district containing early placer mining, drift mining, and ground-sluicing features, as well as low-pressure hydraulic, dragline, bucket line, and mechanical dry-land dredging tailings and features, located in Sacramento County, California. The Corps worked with the California State Historic Preservation Officer and the permit applicant to develop a mitigation strategy to address the proposed adverse effects to the ACCMD. The mitigation strategy includes LIDAR mapping, archaeological excavation, data analysis, installation of public interpretive displays at recreational areas located within the ACCMD, and the long-term preservation and management of a portion of the ACCMD. This presentation discusses the mitigation strategy, results to date, and ongoing work to complete meaningful mitigation with tangible results for the benefit of the public.

[351] *Chair*

Hess, Michael R. [386] see Rissolo, Dominique

Hesse, Jerome [59] see Milliken, Ian

Hicks, Megan (City University of New York), Viðar Hreinsson (Reykjavík Academy), Árni Daniel Júlíusson (Reykjavík Academy), Astrid Ogilvie (INSTAAR, University of Colorado at Boulder, Stef) and Ragnhildur Sigurðardóttir (Reykjavík Academy)

[77] *Grassroots Modernization: Pastoral Economies, Climate, and Political Change in Iceland's Eighteenth through Twentieth Centuries*

The intersecting tensions among Iceland's hay cultivation, livestock productivity, and climate have a long history and a significant influence on both political discourse and local knowledge production. In the eighteenth century, Iceland was assessed by its Danish colonial government as being a marginally productive region in terms of its significant rural surpluses. Even in spite of producing some surplus, the country struggled with periodic famines until the late nineteenth century. These events and perspectives were produced in the context of a highly variable climate which at times severely impacted grass growth and the hay harvest. However, in our study area, the Mývatn region, farmers ecologically restructured their upland, wetland landscape and surpassed perceived limitations on grass and livestock productivity. These shifts were enmeshed with significant social change; a transition away from feudal style governance and toward participation in capitalist free markets. This collaborative interdisciplinary research synthesizes archaeological data, historical documentary evidence, primary sources of ecological information, and climate data in order to understand these deliberate cultural and ecological changes.

Higelin Ponce de Leon, Ricardo (Indiana University Bloomington) and Stacie King (Indiana University Bloomington)

[137] *Motherhood at Majaltepec: A Hypothesis Based on an Early Colonial Period Cemetery in the Sierra Sur of Oaxaca*

In 2011 and 2013, the Nejapa/Tavela Archaeological Project explored a possible Early Colonial period cemetery (AD 1550–1650) at the site of Majaltepec. The excavated portion of the cemetery included eight individuals from five burials, wherein four were subadults, at least one of which is likely a woman, and four were children. In spite of the overall poor preservation, it is clear that the children and subadults were buried together, without accompanying household members of older ages and both sexes. By bringing together ethnohistorical and archaeological information from Oaxaca on marriage and child-rearing, we argue that the Majaltepec funerary rituals represent cultural hybridization of indigenous and Spanish practices connected with the social and cultural construction of motherhood and mothering. In particular, we argue that the close bond between young mothers and children attested in ethnohistorical accounts from the 1800s and 1900s extended from life into death, impacting funerary rituals during the Early Colonial period.

Higgins, Howard (TRC Environmental Corp.)

[394] *The Jemez Mountains Ethnohistoric Assessment: A Critical Examination of an Alternative Approach to Consultation*

Most consultation occurs as part of NEPA and/or Section 106 compliance. That is, there is a predefined, location specific undertaking that concerns traditional communities, such as Native American entities, who are contacted and with whom consultation occurs. This is not, however, the only, or even the best, process by which traditional peoples may be included in consultations with land managers. Some land managing agencies have recently been adopting more proactive approaches. One example of such an approach is that recently followed by Santa Fe National Forest staff. This approach was designed to create and foster ongoing communication with traditional communities concerning projects within those portions of their traditional lands under management by the Forest Service in the Jemez Mountains of central New Mexico. This approach included the initiation of consultation with both Native American tribes and traditional Hispanic organizations well in advance of the federal actions. This paper examines the original concept of the consultation, how it was implemented, and results. Difficulties and drawbacks (as well as strengths and benefits) of the approach are discussed.

[394] *Chair*

Higueras, Alvaro (Independent scholar)

[124] *Reformulating Cultural Heritage Management Strategies in the Post-Soviet Caucasus region.*

The inheritance of Soviet-molded approaches to cultural heritage has seen slow changes in the last two decades in ex-Soviet South Caucasian countries. This is not surprising: if the same specialists continue to run and manage heritage change is expected to be slow; new generations are just starting to work in state agencies. The exposure of the systems to new approaches and its practical application is a difficult task. To compound the problems, the heritage of Georgia, Azerbaijan and Armenia is very mixed. These three countries, of distinct religious majorities, have a mix of populations of the three groups with their consequent material and immaterial heritage. These countries are in the stage of emphasizing the heritage of the majority, hence overlooking the heritage of minorities even when the latter populations are still thriving. This complex population and heritage mix is a consequence of Soviet population movements. These will continue to mark the diversity of these countries, as populations are, for the time being

staying put. In this paper I will describe two cases in the realm of heritage management: a long-term documentation project in Azerbaijan and a case for seeking the private management of an archaeological site in Georgia.

[124] *Chair*

Hildebrandt, William [383] see McGuire, Kelly

Hildenbrand, Jan [296] see Slayton, Emma

Hill, Austin (Dartmouth College) and Yorke Rowan (Oriental Institute of the University of Chicago)

[57] *Drones in the Desert: Unpiloted Aerial Vehicle (UAV) Survey in the Black Desert, Jordan*

Unpiloted Aerial Vehicles (UAVs) and photogrammetry provide a precise tool for high resolution surveys of arid landscapes. In 2016, as part of the Eastern Badia Archaeological Project, we undertook a large survey (32 km²) in the remote Black Desert of eastern Jordan. Although excavation has been ongoing in the survey area for several years, many extant Neolithic structures have not been properly mapped or identified because of the large number of structures and the large scale of the area. For the most part, these stone structures are too small to be effectively mapped by satellite imagery and too spread out to be effectively mapped using traditional terrestrial survey tools. Our survey provides important documentation of the archaeological landscape and a tool for decision making on future work in the region.

Hill, Christopher L.

[87] *Late Quaternary Radiocarbon Geochronology and Stratigraphy on the Northern Plains: Silts, Mammoths, and Buried Soils in the Lower Yellowstone Valley, Montana*

Within the Yellowstone River basin, in eastern Montana, upland landscapes contain silts with buried soils. Radiocarbon measurements from bone and the paleosols provide a basis for proposing a regional chronostratigraphic model. At the Lindsay locality, north of the Yellowstone River, mammoth remains were recovered within silts overlain by a buried soil A-horizon. Samples from the mammoth have been analyzed by six laboratories, using beta decay or AMS. If the radiocarbon determinations older than 12,000 RCYBP provide the most accurate age estimates, then the mammoth is older than the Younger Dryas and possibly associated with the Bølling climate event. Radiocarbon measurements of buried soils at OTL Ridge, in the uplands south of the Yellowstone River, suggest the soils may range in age from about 11,415–9,330 years RCYBP. These silt and paleosol sequences are similar to Oahe Formation (the Aggie Brown member within the Leonard Paleosol) as well as sequences associated with the Brady Paleosol. The silts are interpreted as loess that began to accumulate in upland areas prior to 12,000 RCYBP, while intervals of landscape stability and wetter conditions correlated with Younger Dryas age (10,900–9,800 RCYBP) dark layers or “black mats” may be represented by some of the buried soils.

[110] *Discussant*

Hill, Erica (University of Alaska Southeast)

[35] *Whales, Whaling Amulets, and Human-Animal Relations in Northwest Alaska*

The use of personal amulets appears to have been a common practice among northern hunting peoples of Alaska, Canada, and Greenland. Many of these amulets were intended to facilitate individual human relations with sea mammals. Cooperative whaling, however, required the development of an amulet that mediated group relations with prey. This paper describes a set of Alaska Eskimo whaling “charms” dated to the late nineteenth century and identified in museum collections from across the United States. The charms, actually seats for umiat (large skin boats), represented idealized whales and were intended to flatter, attract, and secure this key prey species. As part of the material culture of whaling, umiaq amulets materialized social relations among the whaling crew, the whale, and the umiaq itself.

[35] *Chair*

Hill, Genevieve (Royal BC Museum)

[247] *Archaeological Repositories in British Columbia*

This paper will begin examining the historical context for the development of archaeological repositories in BC, and the changing role they have played. Commercial archaeologists have, of late, regarded repositories in British Columbia as an afterthought, though this was not always the case. A review of the original stakeholders, and goals of archaeological bodies in BC's past will shed light on where we find ourselves and where we should be headed. The second half of the paper will examine the changing role of repositories in light of their various responsibilities, obligations, and goals. Recent calls by the provincial government for repatriation of archaeological and cultural material to their home communities have begun to influence repository practice in BC. What might BC's archaeological repositories look like in the future? And how can repositories, First Nations, and archaeologists work effectively together to achieve these new goals?

Hill, Kristina (East Carolina University) and I. Randolph Daniel (East Carolina University)

[364] *Reconstructing the Culture-History of Squires Ridge (31ED365)*

Until recently, the prehistoric culture-history of the coastal plain has remained the least understood in North Carolina due to a lack of known sites with stratified context and dateable components. Sites, such as Barber Creek (31PT259) and Squires Ridge (31ED365) situated along the Tar River, have archaeological data that can test the previous model (Moore and Daniel 2011; Phelps 1983). The excavations at these two sites have established the presence of archaeological sequences of four occupation zones dating from the Early Archaic to the Early/Middle Woodland. Previous studies (Daniel et al. 2013; Barbour 2014) have analyzed part of the stratigraphic sequence at Squires Ridge. Through the use of back-plot, frequency, and artifact refitting analyses of the material recovered from the 2011–2012 field seasons, I have explored the stratigraphic sequence of the northern end of the site. Through the continued analysis of Squires Ridge, the culture history of the site as well as the North Carolina coastal plain as a region can be better understood.

Hill, Mark (Ball State University)

[4] *Elemental Analysis of Late Archaic Copper from the McQueen Shell Ring, St. Catherines Island, Georgia*

Excavations conducted at the McQueen Shell Ring site on St Catherines Island off the coast of Georgia recovered several fragments of a copper artifact. These fragments represent an artifact made from a thin sheet of copper, and were recovered from a Late Archaic feature with calibrated radiocarbon dates placing its use between 2300 and 1800 BC. Seven of these fragments were analyzed at the Elemental Analysis Facility of the Chicago Field Museum of Natural History to determine elemental composition with the intent of identifying probable sources for the copper from which the artifact was manufactured. Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) was used to collect elemental composition data for these seven fragments as well as from geological source samples representing Lake Superior, the southern and central Appalachians, and the Canadian

Maritimes. Two independent statistical analyses were performed on the resulting data. Both analyses place the most likely source for this artifact in the Lake Superior region far to the north rather than in the closer sources of the Appalachians, requiring a more complex explanatory framework to account for this long distance interaction or acquisition.

[4] *Chair*

Hill, Mark [4] see Nolan, Kevin

Hill, Matthew E., Jr. (University of Iowa), Sarah Trabert (University of Oklahoma) and Margaret Beck (University of Iowa)

[339] *The Dismal River Complex and the Continuing Debate of Early Apachean Presence on the Central Great Plains*

Great Plains Apachean groups have a strong documentary presence between the mid-1500s to the early 1700s, but the archaeological record of these groups is poorly understood. Early researchers such as James Gunnerson and Waldo Wedel argued strongly that Dismal River sites represented the earliest expression for Apachean groups in the Central Great Plains. These claims are still widely accepted, in part because there is little recent work to contradict them. The exciting research on early Navajo and Promontory sites in the last decade addresses larger questions about Proto-Apachean population movements, highlighting a possible role for Dismal River archaeology in reconstructing movements to the south. So far, efforts to include Dismal River data in the larger Proto-Apachean picture often rely on outdated information. Here we synthesize current views of the Dismal River complex, focusing on new data for site chronology and ceramic technology that help us reevaluate older ideas about Dismal River identity and interactions with neighboring groups. We highlight how the Dismal River complex can contribute to broader discussions of Apachean community formation across North America.

Hill, Matthew E., Jr. [344] see Tharalson, Kirsten

Hill, Matthew G. (Iowa State University), Thomas Loebel (Illinois State Archaeological Survey) and John Lambert (University of California—Davis)

[342] *Synthesis and Assessment of the Folsom Record in Illinois and Wisconsin*

Census of avocational and public collections for Folsom and Midland artifacts from Illinois and Wisconsin signals a substantial Folsom occupation in the Upper Midwest. Over 200 points and preforms demonstrate a southwest–northeast pattern of point manufacture, use, discard, and loss across much of Illinois and the southern third of Wisconsin. The distribution of these artifacts overlaps to a large extent; however, most Midland points occur in Wisconsin. This non-fluted weaponry is interpreted as a techno-situational response to the intrinsic properties and distribution of regional toolstones, combined with the relatively high cost of fluting failure experienced during periods of focused hunting. Folsom mobility and land use are structured along major rivers, with southern Wisconsin most often functioning as a main destination of group movement. Woodland caribou (*Rangifer tarandus*) are the inferred focal prey and organizational driver of Folsom adaptations in the Upper Midwest.

Hill, Rebecca (Tulane University)

[67] *Moderator*

[67] *Discussant*

Hillerdal, Charlotta (University of Aberdeen, Scotland), Kate Britton (University of Aberdeen, UK), Warren Jones (Qanirtuuq Inc., AK, USA) and Rick Knecht (University of Aberdeen, UK)

[144] *Nunalleq: Archaeologies of Climate Change and Community in Coastal Western Alaska*

Northern sea ice levels are at an historical and millennial low, and nowhere are the effects of recent climate change more pronounced or destructive than in the Western Arctic, with the erosion and subsequent loss of coastal archaeological sites in this area being yet another casualty. Based in the community of Quinhagak, and at the well-preserved precontact Yup'ik site of Nunalleq, our project examines the complex relationship between past cultures and ecosystem change, and the interplay between modern climate change, archaeology and heritage. Organic and inorganic artifacts and bioarchaeological material from Nunalleq are now feeding diverse but complementary interdisciplinary studies of diet, population genetics, zooarchaeology, paleoentomology, climate change and culture history in the region. Using the processes, as well as the products of archaeological research, our community-based project is illuminating the impact of the Little Ice Age on precontact Yup'ik in the Yukon-Kuskokwim Delta; building sustainable frameworks for documenting local sites under threat; and providing new contexts for encountering and documenting the past.

Hills, Kendall (University of Illinois at Chicago)

[214] *Investigating the Socio-Ecological Entanglement of Integrative Mechanisms among the Charter States of South and Southeast Asia*

The prime objective of the Socio-Ecological Entanglement in Tropical Societies (SETS) project is to produce a comparative study of socio-ecological dynamics in a variety of low-density tropical urban civilizations through cross-cultural and transdisciplinary investigations. This paper highlights the contribution of the SETS's integrative mechanisms sub-project, whose primary goals are to examine, evaluate, and compare the integrative mechanisms evident within a sample of charter states in South Asia, Southeast Asia, and Mesoamerica. Although anthropologists and archaeologists have identified various methods of state integration, this research concentrates on the monumental public architecture and spaces of the built landscape which foster integration. Such integrative mechanisms include, but are not necessarily limited to roads, temples, monasteries, markets, administrative nodes, hospitals, rest houses, and storage facilities. The construction and subsequent maintenance of these integrative mechanisms would have been an important factor in the consolidation and stability of early tropical states. Through their construction and continual maintenance states often become highly entangled in a web of reliance and resource input with their integrative mechanisms. This form of entrapment may then lead to lower levels of resiliency, and the vulnerability of the state in general.

[214] *Chair*

Hilmer, Hilary (University of Alaska, Fairbanks) and Ben A. Potter (University of Alaska, Fairbanks)

[46] *Faunal Analysis of the Village Site, Healy Lake, Central Alaska*

Healy Lake Village Site, an important multicomponent site with occupations spanning the terminal Pleistocene and Holocene provides an important opportunity to address fundamental issues of subarctic hunter-gatherer economies as they changed through time. To date, there are only a limited number of sites in former Beringia with preserved faunal remains. This poster presents zooarchaeological analyses and interpretations from well-preserved mammal, bird, and fish remains addressing current questions of economic change in eastern Beringia (and the western Subarctic) from the earliest Americans to recent Athabaskans.

Hilson, Heather (Pennsylvania State University), Sarah B. McClure (Pennsylvania State University) and Timothy M. Ryan (Pennsylvania State University)

[151] *Comparing Bone Structure and Domestic Sheep Management Strategies Using Microcomputed Tomography (microCT)*

Bone structure is known to reflect behavioral differences related to locomotion, diet, and activity patterns. We present new data using microcomputed tomography (microCT) to analyze cortical and trabecular bone structure on samples of modern domestic sheep bones from individuals with known biogeographies and life histories. Indicators of skeletal robusticity, such as thicker cortical bone, higher trabecular bone volume fraction, and thicker trabeculae, reflect consistently higher bone strain and therefore should be found in sheep that are moved frequently and/or over long distances. In contrast, penned sheep will have relatively gracile skeletons, reflecting lower activity levels and less movement. By comparing penned and transhumant modern sheep, we assess the viability of this approach to identify domestic animal management strategies in the past.

Hinojosa, Luis Felipe [222] see Vidal Elgueta, Alejandra

Hinojosa-Balino, Israel (Durham University) and Gerardo Gutiérrez

[306] *Applications of Photogrammetry in Understanding Spatial and Ritual Contexts of Caves in the La Montaña Region, Eastern Guerrero*

Mapping caves has always been a daunting task, given the complexity of its forms and the usually difficult access for surveyors and their equipment. 3D modeling of the exterior and interior of some caves is now possible using photogrammetry. Here, we present how we captured the complexity of the Mesoamerican underworld using both drones and digital photography in the caves of Guerrero.

Hirahara, Nobutaka (Waseda University)

[211] *Feasting and Concentrated Pottery Production in East Cape, Papua New Guinea*

East Cape, the southeastern tip of Papua New Guinea mainland, is one of the pottery production areas in southern Massim. Domestic pottery production has continued to the present day, mainly made by female potters to supply their own needs. However, more extensive pottery production beyond the household level occasionally occurs, especially when funerals (toleha) are held. Toleha are organized by the matrilineal descent group (guguni) of a dead person; the potters who belong to the descent group get together and make the large amount of pottery used for feasting. In addition, any surplus pottery is traded with people of surrounding islands for foods served in the feast through local exchange called kidoko. The feast-associated pottery production for toleha, and local exchange are complementary. On the other hand, the pottery produced for toleha have strong stylistic similarity caused by the same technique shared with the potters. Here, I focus on the toleha pottery production system, and discuss the social linkage between stylistic similarity and the structure.

Hirasawa, Yu (Center for Ainu and Indigenous Studies, Hokkaido University), Ren Iwanami (Department of Natural History Sciences, Hokkaido U), Masaki Naganuma (Center for Ainu and Indigenous Studies, Hokkaido U), Andrzej Weber (Department of Anthropology, University of Alberta) and Hirofumi Kato (Center for Ainu and Indigenous Studies, Hokkaido U)

[330] *Maritime Archaeology in Hamanaka 2 Site on Rebun Island, Japan: Preliminary Report of Field Research from 2011 to 2016*

Since 2011, BHAP and JSPS Core to Core program have been conducted the joint archaeological investigation at Hamanaka 2 site on Rebun Island, Northern Japan. This site has been recognized as important sand dune site that provided well-preserved archaeological materials date back to middle Jomon period (ca. 5500–4500 cal BP). Interdisciplinary studies conducted by participating scholars produced significant outcomes in archaeology, physical anthropology, molecular biology, paleobotany and radiocarbon dating. Until today, we gradually gained our knowledge of the site structure. Hamanaka 2 has five major archaeological periods in the same area. On the one hand, broadly distributing shell midden layers formed during Okhotsk cultural periods (ca. 1500–900 cal BP) contained rich fish and sea mammal remains with a few human remains. On the other hand, other Jomon (late—final), Epi-Jomon and Historical Ainu layers represent different site function because of less fish and shell remains. Despite of these differences, there are marine-related ritualistic evidences from different cultural components that suggest physical and mental connection between people and marine resources. In this paper, authors report current results of research on Hamanaka 2 and discuss differences and similarities of in-site activity with excavated evidence.

Hirbo, Jibril [287] see Ambrose, Stanley

Hirth, Kenneth G. [8] see Buckley, Gina

Hirx, John [392] see O'Neil, Megan E.

Hiscock, Peter (University of Sydney)

[212] *Digging into the Supernatural World. Cinema's Intrinsically Religious Depiction of Archaeology*

Over the last half century film makers have created hundreds of movies about archaeologists. Many of these films present narratives that are located in supernatural worlds and explicitly religious in character. Within these supernatural and extraterrestrial stories, archaeologists are positioned as mage or priest, the individuals with the knowledge to release magic into the world or to prevent release. These fictional representations of archaeologists as active participants in supernatural dramas advocate pseudoarchaeological and religious views that reflect nonscientific beliefs popular in film studios as well as with audiences across the globe. This paper explores the ways in which film-makers have created a concept of archaeologist that has helped them pursue mythic imperatives.

Hiscock, Peter [168] see Faulkner, Patrick

Hixon, Sean (Pennsylvania State University), Emma Elliott Smith (University of New Mexico), Brooke Crowley (University of Cincinnati), Richard Bankoff (Pennsylvania State University) and Douglas J. Kennett (Pennsylvania State University)

[152] *Patterns in Amino Acid Delta 15N Values of Lemurs Are Inconsistent with Aridity Driving Megafaunal Extinction in Southwestern Madagascar*

Early human colonists of Madagascar encountered a diverse endemic fauna during the late Holocene that included elephant birds, pygmy hippos, and giant lemurs. All fauna >10 kg went extinct in the past 1,000–2,000 years. Direct human predation and anthropogenic landscape change help explain

aspects of the extinction pattern. Increasing aridity may have also played a role in some regions, but its contribution remains controversial. We track changes in aridity during the past 4,000 years in southwestern Madagascar using nitrogen isotope ($\delta^{15}\text{N}$) values of individual amino acids preserved in bones from extinct *Pachylemur* and extant *Propithecus* from two subfossil sites: Tsirave and Taolambiby. We use the $\delta^{15}\text{N}$ values of source amino acids as a proxy for aridity and the spacing of $\delta^{15}\text{N}$ values between source and trophic amino acids to quantify the trophic position of these lemurs. Despite paleohydrological evidence for a lowering water table and paleoecological evidence for the expansion of relatively arid savanna between 4,000 and 1,000 years ago, the isotope data indicate that extinct lemurs did not live in increasingly arid habitats. Thus, aridity cannot be the primary driver of lemur extinction in southwestern Madagascar.

Hlubik, Sarah [154] see McKinney, Caroline

Hobson, Keith (University of Western Ontario)

[284] *Discussant*

Hodge, Christina (Stanford University)

[74] *An Intersectional Archaeology of Colonial White Male Privilege?*

I suggest that it is worth pursuing an archaeology of white male privilege through the contextual study of white privileged males. Among many outcomes, this project can de-naturalize “maleness” and “whiteness” as nomothetic and unmarked—thereby advantaged—social categories and reveal systematized advantage/oppression. Historical gendering was a nuanced process. Masculinity had multiple practiced and experienced forms. They persisted even within a tightly controlled environment, such as colonial Harvard College in Cambridge, Massachusetts. There, enfranchisement was shaped by gender, which was itself realized through age race, ethnicity, spirituality, and status; by physical and intellectual capacity, education, and personality; by consumer and sexual desires; and by the material things and physical settings through which social reproduction took place. A study of intersecting identities may offer special insight into the invention of masculinities and their association with authority in colonial America. Intersectionality is even embedded in the now-familiar phrase “white male privilege,” which presumes an essential relationship between race, gender, and power. But the experiences of young, well-connected, educated Englishmen are not a typical subject for an intersectional approach. This paper asks if an archaeology of colonial white male privilege can, or should, benefit from Intersectional Theory and considers possible paths forward.

[74] *Chair*

Hodges, Charles (Pacific Geoarchaeological Services)

[51] *Late Pleistocene-Holocene (LPH) Paleogeography of the Bear Creek Site (45KI832), Puget Lowland, Western Washington*

Stratigraphic and soil horizon sequences within the boundaries of archaeological sites are remnants of formerly more extensive paleolandscapes. Since these fragments have both spatial and temporal boundaries extending beyond the site boundaries, the sedimentary and soil bodies defined within an archaeological site represent segments of past landscapes and reflect, sometimes indirectly, relationships with the broader surrounding paleoecosystem. In order to further our understanding of LPH human-land interaction, we develop here a preliminary model of the landscape elements in the vicinity of the site utilizing offsite legacy geotechnical data coupled with retrieval of additional core data to document the dynamics of the changing LPH landscape surrounding the Bear Creek site. During the LPH, the site vicinity experienced numerous landscape changes including inundation from Glacial Lake Bretz, ending about 15,000 cal B.P.; high-energy recessional channeling; significant fan-delta formation; multiple post-Bretz lake-level changes; and early to mid-Holocene alluvial flooding and channel migration during emergence of the Bear Creek and Sammamish River fluvial systems. As a result of this study, we can begin to correlate the Bear Creek site depositional history to major postglacial events in the surrounding Lake Sammamish basin, and begin assessing local buried landforms for potential to contain archaeological materials.

Hodgetts, Lisa (University of Western Ontario) and Laura Kelvin (Independent Researcher/University of Western Ontario)

[172] *At the Heart of the Ikaahuk Archaeology Project*

For several years, we have been working with Inuvialuit community members from Sachs Harbour in Canada's Northwest Territories, developing a research partnership called the Ikaahuk Archaeology Project (IAP). Many Inuvialuit connect with the past through “doing”; engaging in a range of traditional and nontraditional activities. Through them, they come to know the past physically, intellectually, emotionally, and spiritually. While archaeologists primarily engage with the past intellectually, many of us also engage with the past in these other ways. Here, we outline how our own multifaceted experiences over the course of the project, and within archaeology more broadly, inform our thinking about future research directions for the IAP. These experiences have led us to recognize our own limitations and fostered our desire to work toward social justice alongside our Inuvialuit partners. Beyond the IAP, we suggest that more explicitly framing archaeology as an act of the body, the heart, and the soul, as much as the mind, would help to move it beyond its colonial history. This reframing will mean building on existing trends in Indigenous archaeology, activist archaeology and co-creation to broaden the kinds of “doing” that constitute archaeology.

Hodgetts, Lisa [35] see Goodwin, Rebecca

Hodgins, Greg (University of Arizona)

[254] *Discussant*

Hodgins, Jamie [85] see Pothier Bouchard, Genevieve

Hoerman, Rachel (University of Hawaii-Manoa)

[333] *Sex and Gender in Southeast Asian Rock Art: Case Studies from Borneo*

Multiple indigenous and intrusive Borneo rock art (the additive or reductive human modification of naturally fixed-in-place stone) traditions depict figures and abstract designs that can be interpreted as sexed/gendered. Dating from the terminal Pleistocene through modern period, these images are an untapped source of archaeological information regarding the roles and interactions of the biological sexes and culturally constructed and ascribed genders. This paper uses rock art to identify and examine sex and gender in groups indigenous and intrusive to Borneo. It treats rock art through formal analysis and employs archaeological and ethnohistoric information on iconography and ideology to delineate sexed/gendered rock art images and the prehistoric roles, relationships, values and structures of power they possibly represent. Results reveal chronologically and culturally distinct depictions of sex and gender both restricted to Borneo Island and found regionally that can be associated with hunter-gatherers as well as later “Neolithic” and historic

groups. This research generates insights into sex and gender in ancient and historic societies on and beyond Borneo. It also underscores the informative potential of rock art and gender archaeology in Southeast Asia.

Hoffman, Brian (Hamline University), James Myster (U.S. Fish and Wildlife Service), Steve Goranson (Minnesota Historical Society), Rikka Bakken (Hamline University) and Camille Warnacutt (Hamline University)

[341] *Archaeology of the Port des Morts Lighthouse Ruins (47DR497): A Mid-Nineteenth-Century Lighthouse Site*

The Port des Morts ruins (47DR497) are from a Great Lakes lighthouse in operation for a brief nine years from 1849 to 1858. Located on Plum Island off the tip of Wisconsin's Door Peninsula, this hastily constructed and poorly positioned lighthouse was home to William Riggins his wife Phebe and their growing family for all but the lighthouse's final year. Historic documents suggest they lived a difficult frontier existence, but otherwise little is known about their time on the island. Now part of the Green Bay National Wildlife Refuge, in 2013 the U.S. Fish and Wildlife Service and Hamline University began investigating the ruins prior to the island being opened to visitors. Three seasons of excavations uncovered intriguing architectural evidence of desperate attempts to stabilize walls and keep the lighthouse functioning. The recovery of a robust assemblage of over 15,000 artifacts and faunal remains paints a picture of their daily lives from troubles with lanterns, to teaching writing skills, to feeding the family dog.

Hoffman, Nancy (Minnesota Historical Society)

[66] *Discussant*

Hoffman, Sarah E. (University at Buffalo)

[245] *Place, Practice, and Pathology: Dental Pathology in Medieval Iceland*

This study focuses on the cultural, political, and biological factors that led to the formation of a unique pattern of dental pathology within an Icelandic population at Haffjarðarey, Iceland between the thirteenth and sixteenth centuries. The Haffjarðarey church and cemetery clearly served as an important meeting place and burial site for the surrounding region during this period. A paleopathological analysis of the population reveals a high rate of ante-mortem tooth loss, severe tooth wear, and alveolar bone resorption. This project incorporates analysis of the human skeletal remains from the Haffjarðarey church cemetery, interpretations of community attachment (topophilia) and subsequent fear (topophobia) of this once revered location and later feared location. It is argued that a combination of cultural practices specifically food preparation and the spinning of wool, political and economic upheaval associated with the imposition of Norwegian authority in the thirteenth century, and a lack of sufficient nutritional intake resulted in widespread periodontal disease within the population of Haffjarðarey. The abandonment and transformation of Haffjarðarey may have reinforced long held Icelandic folklore beliefs in the power of the dead and their space on the living.

Hoffman, Sarah E. [90] see Ruhl, Erika

Hoffmann, Tanja (Circa Heritage Consulting)

[172] *"We ask only that you come to us with an open heart and an open mind": The Transformative Power of an Archaeology of Heart*

Indigenous scholars propose that the outside researchers most useful to indigenous communities are those willing to engage in a process of self-discovery and transformation. These researchers are willing to learn from, not just about, the people they work with. This paper contemplates the challenges and opportunities that arise when archaeologists embark on this transformative journey. I use personal examples drawn from two decades of conducting archaeology with and for indigenous communities to suggest ways in which heart-centered archaeology can transform our discipline. I close with examples of the transformative power of heart-centered interpretations of the past.

Hoffmeister, Kristin [162] see Trask, Willa

Hofman, Corinne L. (University of Leiden)

[133] *Ancient Networks of the Caribbean: Interaction and Exchange across the Historical Divide*

In this paper, we present multiple lines of evidence for the existence of interwoven and dynamic ancient networks in the Caribbean. This region is characterized by a long and unique history of social relationships between communities and peoples at various temporal and spatial scales. Through time, Caribbean networks of human mobility and the exchange of goods and ideas were shaped by expanding and contracting group territories, fission and fusion of local communities, and variable degrees of sociopolitical integration, all of which were important in defining forms of interaction. With the aid of interdisciplinary approaches and new methods and techniques grand scale interaction networks have been revealed that were in place between 6000 BC and the time of colonial encounters from AD 1492 when they were exploited by the European colonizers. These enigmatic networks of the Caribbean were fundamental in the shaping of modern global society.

[395] *Chair*

Hofman, Corinne L. [69] see Ziesemer, Kirsten

Hofman, Courtney (University of Oklahoma), Brian M. Kemp (University of Oklahoma), Cecil Lewis (University of Oklahoma), Christina Warinner (University of Oklahoma) and Krithivasan Sankaranarayanan (University of Oklahoma)

[86] *Biomolecular Archaeology: New Insights from the Past*

The field of biomolecular anthropology has been transformed in recent years by new technological and methodological approaches, including DNA, protein and small molecule characterization. At the Laboratories of Molecular Anthropology and Microbiome Research (LMAMR) at the University of Oklahoma, we have successfully expanded these approaches to study past populations, for example through the investigation of: 1) ancient animal use, translocations, and domestication, 2) human dietary adaptations, and 3) the coevolution of humans and their microbes. Specifically, the resolution offered by some of these techniques permits testing a multitude of hypotheses with only small amounts of archaeological material, including those from traditionally underutilized sources, such as dental calculus. While these sample sources and methods have the potential to make substantial contributions to archaeology, fostering strong interdisciplinary collaborations with archaeologists, anthropologists, and other natural scientists is critical to advancing this field. Only by integrating the archaeological and cultural context with biomolecular data, can meaningful conclusions be derived. Together these datasets can address important anthropological questions about human health and evolution, human-environmental interactions, and broad scale cultural change.

Hofreiter, Michael [378] see Speller, Camilla

Hogg, Erin (Simon Fraser University) and John Welch (Simon Fraser University)

[194] *Archaeological Assessment of Land Claims*

The 2014 Tsilhqot'in Decision in the Supreme Court of Canada reaffirms the relevance of archaeological research in the adjudication of Indigenous land and title claims. The evidentiary standards adopted by the Court, that occupation must be sufficient, continuous, and exclusive, invite comparisons with previous archaeological contributions to land claim settlements, refresh inquiry into current applications of archaeological data and perspectives to argue for (and against) affinities between present and past social groups, and create a template for future efforts to assess the strength of historical claims to territory.

Hogg, Nicholas [374] see Chiu, Scarlett

Hoggard, Christian (Centre for the Archaeology of Human Origins, University of Southampton, UK.) and Cory Cuthbertson (Centre for the Archaeology of Human Origins, Unive)

[100] *Current Methodological Considerations in the Application of Two-Dimensional Geometric Morphometrics within Hand Ax Assemblages*

In the construction of past hominin behavior, frameworks emphasize the role of morphological variation within a particular artifact class, as deviations and commonalities in shape exemplify conscious/unconscious decisions by past populations and individuals. For early prehistory this is best illustrated through discussions of shape variance, and its role in understanding cognition and aspects of cultural transmission. In the formal categorization of hand ax shape variance, within a statistical framework, recent methodologies have utilized two-dimensional geometric morphometric frameworks through Fourier-based transformations or semi-landmark (sensu Bookstein) analyses. We examine an essential methodological protocol, under-looked in literature, and a potential source of shape-error, specifically the orthogonal projection of a three-dimensional hand ax into a two-dimensional shape-space. Various technological and morphological rationale have been adopted in determining which planform profile should be digitized and analyzed, however the effect each of these different orthogonal projection methods have on a control dataset is unknown. To what extent do rationale influence the main sources of shape variation, the underlying statistical output (e.g., PCA scores or Procrustes distances), and the ability to discriminate between different groups? Using an experimental dataset of known-sided hand axes, we conclude that issues of orthogonal projection are essential within a priori considerations of hand ax shape analysis.

Hoggard, Christian [287] see Cuthbertson, Cory

Hoggarth, Julie (Baylor University), Brendan Culleton (Pennsylvania State University), Claire Ebert (Pennsylvania State University), Jaime Awe (Northern Arizona University) and Douglas J. Kennett (Pennsylvania State University)

[81] *Bayesian Approaches for Chronology-Building in Maya Archaeology: Direct AMS 14C Dating of Burials in the Belize River Valley*

Chronology-building in Maya archaeology has long been dominated by relative ceramic typologies based on excavations conducted in the 1950s, with date ranges temporally grounded by long-count calendar dates and a small number of imprecise radiocarbon dates. Higher-precision chronologies based on more recent methodological innovations in radiocarbon dating, including Accelerator Mass Spectrometry (AMS) 14C dating, Bayesian statistical modeling of radiocarbon dates, and ultrafiltration and XAD purification of bone collagen samples remain under-employed in Lowland Maya archaeology. Here we present a new research program that directly dates burials from sites across the Belize River Valley, located in the central Maya lowlands. This region is notable as the location of the well-known site of Barton Ramie, where one of these early and influential ceramic chronologies was developed. Using a priori contextual information from grave goods and stratigraphic relationships, we present high-precision AMS 14C dates of burials from the sites of Barton Ramie, Baking Pot, and Cahal Pech. We use Bayesian chronological models to constrain radiocarbon distributions, serving as the framework to develop more precise time frames for ceramic types, complexes, and phases in the Belize Valley and elsewhere in the Maya Lowlands.

Hoggarth, Julie [81] see Ebert, Claire

Holdaway, Simon [38] see Davies, Benjamin

Holen, Kathleen [193] see Holen, Steven

Holen, Kathleen (Center for American Paleolithic Research) and Steven Holen (Center for American Paleolithic Research)

[193] *Comparison of Proboscidean Bone Notches to Experimental Dynamic and Static Notches on Cow Bone*

Notches produced during bone breakage by impact (dynamic loading) and pressure (static loading) present quantitatively different shapes when measured from the cortical view. The ratio of the measurement of notch breadth to notch depth differentiates dynamically (arcuate) from statically (semi-circular) produced notches. This poster compares a reference sample of Proboscidean limb bone notches with experimental samples of dynamically and statically loaded notches on cow femora and shows that notch shape is useful in determining the agency that modified large prey animal bone assemblages.

Holen, Steven (Center for American Paleolithic Research) and Kathleen Holen (Center for American Paleolithic Research)

[193] *Use Wear and Breakage Patterns on Cow and Elephant Limb Bone Produced from Anvil Contact during Breakage Experiments*

Patterns of use wear and distinctive breakage are caused when a bone is broken on an anvil surface. The use wear on cortical bone surfaces consists of high polish and linear striations. Breakage patterns can include negative cones of percussion, cone flakes, rebound flakes removed from the cortical surface and V-shaped or U-shaped projections. In sites where there is only evidence of bone processing, these features, and other distinctive breakage patterns, can help identify human activities in the absence of chipped stone tools.

Hollenback, Kacy (Southern Methodist University) and Abigail Fisher (Southern Methodist University)

[127] *Chien Opérateur: Dogs as Technological Systems in the Northern Great Plains*

In the past, like today, dogs (*Canis familiaris*) were not only human companions, they were also tools, beasts of burden, alarm systems, sources of food, and ritual elements. Since first domesticated, humans have shaped dogs physically and behaviorally, and they have, in turn, shaped our societies. As such, domesticated canines can be treated as a form of technology, regardless of their own forms of agency. By technology we refer to objects (i.e., dogs and linked artifacts), related practices, and associated knowledge. In this paper, we use concepts developed in technological theory to explore canid technological systems of the Northern Plains over time. Using data derived from ethnohistory, early ethnographies, and archaeology, we situate human-canine relationships within the context of other technological systems embedded in Plains cultures.

Hollesen, Jørgen [224] see Harmsen, Hans

Holley, George [375] see Becker, Rory

Hollinger, Eric (Smithsonian Institution)

[185] *Symbols of Ferociousness: Oneota Trophy Taking*

The late prehistoric Oneota tradition developed and spread rapidly across an immense territory in a very short period of time. That expansion, and the period of territorial stability which followed were marked by violence on large and small scales. Taking of human trophies was an integral component of the violence of the time and was steeped in warrior tradition, religious ritual and symbolism reflecting broadly held ideologies. Trophy taking was likely more common than has been acknowledged. Diverse but scattered evidence suggests the presence of human trophies was an everyday fact of life and likely fed a war ethos dominant among Oneota and contemporary communities.

Hollingshead, Analise (Texas A&M University) and Michael Waters (Center for Study of First Americans, Texas A&M University)

[87] *Geoarchaeological Investigation at Buffalo Ranch Site, Burleson County, Texas*

The Buffalo Ranch site is exposed at the base of a cutbank along the Brazos River in Burleson County, Texas. Here, two transitional Paleoindian–Early Archaic Wilson and Big Sandy projectile points along with other artifacts were found eroding from a silty sand deposit believed to be a prehistoric natural levee. This layer and its associated artifacts lie approximately 14 m below the ground surface. Its stratigraphic position indicates an age of approximately 8000 to 8500 14C yr BP, which is younger than ages from other sites with the Wilson and Big Sandy projectile points. The Buffalo Ranch site adds to our understanding of the late Paleoindian–Early Archaic transition in Texas.

Holly, Donald H. (Eastern Illinois University)

[319] *Toward a Social Archaeology of Food in Later Newfoundland Pre/History*

Archaeologists have long been interested in understanding and modeling subarctic hunter-gatherer subsistence strategies. Traditionally, much of this work has relied on the ethnographic record for analogy and sought to situate forager decision making processes in terms of the calculus of optimal foraging and adaptations to the natural environment. While useful, these approaches risk flattening pre/historic subsistence strategies to the point of timelessness and minimizing the social and cultural contexts in which food choices were also situated. Drawing on the later pre/historic archaeological record (AD 100–1829) of the Beothuk Amerindians of the island of Newfoundland, this paper explores the ways in which subsistence strategies and food projected identity, reflected changing historical conditions and social relations, played into ritual and ceremonial practice, and embodied a cultural worldview.

[319] *Chair*

Holly, Donald H. [144] see Wolff, Christopher

Holm, Emma

[184] *Mount Rainier's Oldest Artifact: Temporally and Geographically Contextualizing Early Microblade Technology*

The temporal distribution of archaeological sites bearing differing microblade technologies in North America suggests that microblade technology spread from what is today central Alaska onto the Alaskan Panhandle and the British Columbia coast before extending across the continent's western territory. By the end of the early Holocene, microblade technology had reached present-day Southern California. In 2007, excavations at the Buck Lake open-air site in Mount Rainier National Park revealed a microblade core located in pre-Mount Mazama strata and several microblades located in younger stratigraphic layers. These artifacts provide new data on the southern temporal and geographic scope of microblade technology, but they have yet to be included in major considerations of the distribution of this technology. This paper examines similarities between the Buck Lake microblade core and other lithic artifacts in the Buck Lake assemblage, particularly those which are associated with the earliest occupation of the site, as well as how the technological and stratigraphic characteristics of the Buck Lake core compare to microblade technology at other southerly located sites.

Holman, Darryl [144] see Miller, Hollis

Holmberg, Karen (New York University)

[148] *Discussant*

Holmes, Charles [47] see Lanoë, François

Holmes, Keith (Hakai Institute), Will McInnes (Hakai Institute), Iain McKechnie (University of Victoria), Dana Lepofsky (Simon Fraser University) and Darcy Mathews (University of Victoria)

[49] *Speed Mapping: Using Drones to Construct Imagery and Elevation Models of Cultural Intertidal Landscapes*

Unmanned aerial systems (UAS) have been used extensively in remote sensing in recent years because of their low cost and ease of implementation. Mapping cultural sites in intertidal areas is challenging because of the short time window in which features are exposed. UAS provide an efficient and high spatial resolution method of capturing imagery and elevation data for a variety of cultural landscapes. We have used UAS at sites along the coastal margin of British Columbia to map clam gardens, fish traps, tidal pools, and exposed archaeological sites. Our study areas are in coastal British Columbia, including the West Coast of Vancouver Island intertidal cultural sites, the Discovery Islands clam gardens, and Central Coast village site and fish traps. The data collected can be processed in the field to provide near-real-time imagery and elevation data that researchers can use to better locate

and understand complex cultural sites. The data can also be integrated into geographic information systems for further spatial analysis both during and after archaeological field campaigns.

Holmquist, Lena [96] see Muñoz-Rodríguez, Mariana

Holst, Melissa (University of Louisville) and Jonathan Haws (University of Louisville)

[90] *Late Magdalenian Lithic Technology at Lapa do Picareiro, Central Portugal*

Lapa do Picareiro, a cave located in Portuguese Estremadura, contains continuous deposits dated to the Late Pleistocene. As one of the highest elevation Upper Paleolithic sites currently known in Portugal, questions are raised about the function of the site during this time. The high resolution datasets generated from the ongoing excavation allow for various types of analysis to help shed light on a broader understanding of the site's function. This poster presents a comprehensive analysis of the lithic assemblage recovered from the Late Magdalenian layer of F/G (12,300 and 11,800 BP). The data generated from this study, when looked at in conjunction with the previously analyzed faunal assemblage, helps to provide a broader understanding of the site's function during the Late Magdalenian. The analysis focuses on raw material preference and use, representation of reduction phases, and typologies present in the assemblage. These data are then compared with other contemporaneous sites in the region to see what, if any, inferences can be drawn about location and site function. This work ultimately contextualizes the observed patterns found in the lithic assemblage in the broader context of the Late Magdalenian in southern Iberia.

Holyoke, Kenneth (Stantec Consulting Ltd.), Susan Blair (University of New Brunswick *1st author) and Ramona Nicholas (Green Eagle Services Inc.)

[17] *Toponymical Indices to the Past Landscape and Resource Extraction along the Wolastoq and Its Environs*

Previous studies in New Brunswick have described traditional terminology and place-names (Blair, nd.; Ganong 1896; Rayburn 1975) as well as traditional lifeways and practice (Perley et al. 2000) along the Saint John River, or, the Wolastoq. These studies recognize the intimate relationship between the river and its people, and the language that describes the connection to the river and its dynamic landscape. Certainly, this applies to a perception of resource locales along the river, from where to catch fish, to sourcing wood for a wigwam, to locations for quality toolstone resources. Drawing on these toponymical indices in comparison to the distribution of known archaeological sites presents an opportunity to reflect on the interpretations we have about site function and location, as well as the memory of these places through time and the importance of certain resources and resource extraction locales.

Hommel, Peter [330] see White, J. Alyssa

Homsy, George [159] see Hart, Siobhan

Honyouti, Dwight [34] see Fladd, Samantha

Hoogland, Menno (Leiden University) and Corinne L. Hofman (Leiden University)

[395] *Colonial Encounters in the Southern Lesser Antilles*

During the colonization processes, vast webs of social relationships emerged between Amerindians, Europeans, and Africans in the Lesser Antilles. The intercultural dynamics that materialized during this period were likely contingent on local and regional networks of peoples, goods and ideas which had developed in the Caribbean over the previous 5,000 years. This paper focuses on the impacts of colonial encounters on indigenous Carib societies by studying transformations in settlement pattern and organization, material culture, and network strategies. Recent excavations at the early colonial sites of Argyle, St. Vincent and La Poterie, Grenada have revealed the remains of indigenous villages and a set of material culture evidencing the first Amerindian, European and African interactions in the southern Lesser Antilles. In this paper we will advance novel perspectives on intercultural dynamics in colonial encounter situations and contribute to discussions of indigenous resistance, cultural transformations, and cultural diversity in an ever globalizing world.

Hoogland, Menno [69] see Mol, Angus

Hook, Fiona [302] see Manne, Tiina

Hoover, Corey (University of Wisconsin–Milwaukee), Patrick Mullins (University of Pittsburgh) and Brian Billman (University of North Carolina at Chapel Hill)

[231] *GIS and Drones in the Middle Moche Valley: An Analysis of Huaca Menocucho*

Huaca Menocucho is a prehistoric monumental center located in the middle Moche Valley on the northern coast of Peru. The site shows evidence of several construction and occupation phases of the Moche Valley cultural sequence (Prieto and Maquera, 2015). Huaca Menocucho and the surrounding area have faced looting and destruction from several sources. In July 2016, MOCHE, Inc. conducted a drone survey combined with a systematic surface artifact survey to record information about activities and taphonomy of the site's occupation. With the use of photogrammetry software, drone technology, geospatial analysis, and interpolation of surface artifact densities, this study outlines the spatial extents and densities of several of the site's occupational phases. Additionally, this study explores how an integration of high-resolution site DEMs and systematic surface collections may assist archaeologists in investigating sites that have been heavily looted.

Hoover, Corey [336] see McTavish, Rachel

Hopkins, Maren (Anthropological Research, L.L.C.) and Octavius Seowtewa (Pueblo of Zuni)

[34] *Anshe Ky'an'a and Zuni Traditions of Movement*

After the Zuni people emerged into this present world from Ribbon Falls in the Grand Canyon, they set out on a centuries-long journey in search of their spiritual and physical destination, Idivana. During their travels, the Zuni people split into groups and moved in different directions, forming medicine

societies, acquiring song and prayers, and gaining knowledge about the environment that would become the core of their cultural practices into the present. As such, the places of Zuni's past remain a tangible part of Zuni cultural memory. Recent work conducted on the Fort Wingate Depot Activity, an area known to Zunis as Anshe Ky'an'a, exemplifies the greater concepts that underlie Zuni traditions of movement. Anshe Ky'an'a, located part way between Chaco Canyon and Zuni Pueblo, was established as a Zuni cultural landscape in the ancient past. Through songs, pilgrimages, the procurement of ceremonial items, and reciprocal offerings made to the ancestors in exchange for spiritual blessings, Zunis literally and figuratively continue to bring Anshe Ky'an'a into their daily lives. In our paper, we draw on the research conducted at Anshe Ky'an'a to further explore how Zuni's history of migrations led to the ongoing values that incorporate movement across their ancestral homeland.

Hopkins, Maren [84] see Elson, Mark

Horgen, Daniel [188] see Hedden, John

Horikawa, Kumiko [138] see Yamamoto, Naoto

Horn, Sherman (Tulane University) and Anabel Ford (University of California, Santa Barbara/MARC)

[204] *Putting El Pilar Back on the Middle Preclassic Map: Assessment and Synthesis of the Architectural Data*

Analyses of early settlement in the eastern Maya Lowlands have benefited from nearly thirty years of research targeting Middle Preclassic (900–350 BC) occupations in the Belize Valley. Frequently overlooked in these settlement pattern reconstructions is the site of El Pilar, which is situated in the limestone hills to the northwest of the Belize River headwaters. Excavations at El Pilar have primarily focused on the impressive Classic-period architectural remains that comprise the site epicenter, but intact Middle Preclassic structures and deposits beneath these constructions suggest the site was home to a vibrant community from at least 800 BC. This paper synthesizes Middle Preclassic architectural data from previous excavations at El Pilar to examine the development of the early community through changes in its built environment. We examine the forms and spatial configurations of Middle Preclassic structures as well as the materials used to build them, and we compare these sequences to more extensively excavated examples to contextualize and interpret architectural developments. Early ceremonial structures, including a possible E-Group assemblage, suggest El Pilar was an important sociopolitical center during the Middle Preclassic and must be accounted for in settlement models of the Belize Valley and its surroundings.

Hornak, Johnathon [99] see Deibel, Corinne

Horning, Audrey (Queen's University Belfast)

[141] *Collaboration, Collaborators, and Conflict: Ethics, Engagement, and Archaeological Practice*

Collaboration in contemporary archaeological parlance principally refers to active engagement with one or more selected groups of stakeholders and coproducers of knowledge. But knowledge is always produced for a purpose, and collaboration, or to be a 'collaborator' in conflict settings implies an allegiance, often deceitful, to one cause or another. When embedding archaeology in conflict transformation activities, being seen as a 'collaborator,' or partisan, can actively work against the aims of peacebuilding. Drawing upon experience in conflict transformation within post-Troubles Northern Ireland (where the term collaborator has very negative connotations), issues of ethics and positionality are considered, and an alternative terminology for embedding archaeology in peacebuilding activity is posited.

Horowitz, Mara (Purchase College SUNY)

[240] *You Are How You Eat: Changes in Dining Style and Society at Late Bronze I Alalakh*

Ceramics are intimately tied to both foodways and normative behavior within a culture. The appearance of a new shape or the long-term persistence of an old shape must be contextualized by first investigating the use to which the vessel was put, a use that can be inferred through multiple lines of evidence and explored using a variety of approaches. Recent excavations at Alalakh have illuminated the site's Late Bronze I period, especially the troubled seventeenth-sixteenth century BC transition from the Middle Bronze II. Striking continuity exists alongside major new introductions. Cups, craters, and pitchers with matching decorations form 'drinking sets' and persist though time even as the specific forms and decorations change in response to foreign aesthetics, suggesting continuity in drinking practices. On the other hand, the introduction of the large and very shallow 'plate' and the loss of Middle Bronze open forms may indicate a dramatic change in the way serving and dining was carried out. This paper examines what the style of dining may say about major social and cultural changes in the transition to the LB I period.

Horowitz, Rachel (Tulane University)

[79] *Technological Organization Approaches to Lithic Analysis: Case Studies from the Late Classic Maya and Magdalenian Spain*

Technological organization approaches to studying lithic technology provide a framework through which to view relationships between people and their technology. Such approaches help us address a wide variety of subjects including mobility, access to raw materials, risk, and time and energy costs. We will address the impact of Beck and Jones' research on organizational approaches to lithic technology, in particular on the study of mobility and resource acquisition using two case studies: Late Classic Maya lithic raw material acquisition in western Belize and mobility and resource acquisition of Magdalenian hunter-gatherers in the Cantabrian region of Spain. These two widely disparate case studies, of sedentary and mobile peoples, highlight the versatility of organizational approaches and the wide-reaching influence of Beck and Jones on lithic scholarship.

[79] *Chair*

Horsley, Timothy (Horsley Archaeological Prospection, LLC), Casey Barrier (Bryn Mawr College), Robin Beck (University of Michigan) and John Kelly (Washington University in St. Louis)

[283] *New Views of Cahokia's Urban Landscape: Multi-instrument Geophysical Survey at the Ramey Field*

In this paper we report on new collaborative research that seeks to investigate the history of precolumbian urbanism and Mississippian culture in the greater American Bottom region of eastern North America. Our research is being designed to take advantage of a wide range of archaeological methods, technologies, and analyses to produce information for Cahokia and other sites in the region. Here, we present initial results from our first season of work at Cahokia. In July 2016, project members conducted a multi-instrument geophysical survey covering around 9 hectares in the Ramey Field portion of the site, an area extending along Canteen Creek north and east of Monks Mound. Our preliminary results are being used to develop research questions that include understanding the history of occupation of this area, monument and plaza construction, and precolumbian landscape modifications and management. Other regional sites that figure into our long-term research designs may also be discussed, including new surveys at the Pulcher site, a large and early mound-town that continued to expand into the mid-twelfth century, overlapping with Cahokia's major transformations.

Horta, Helena (Universidad Católica del Norte), Paz Núñez-Regueiro (Département Patrimoine et Collections, Musée du Qu), Clotilde Castelli (Département Patrimoine et Collections, Musée du Qu), Valentina Figueroa (Universidad Católica del Norte) and Catherine Lavier (Université Pierre et Marie Curie, UPMC Paris 06, U)

[62] *Recovering the Iconography of the One Snuff Tray Ever Collected in Tiahuanaco (Bolivia)*

The Musée du Quai Branly holds a snuff tray allegedly from Tiahuanaco. It was collected by the geologist Georges Courty during the archaeological excavations conducted on the site by the French Scientific Mission to South America in 1903. The wooden artifact, with inlays of turquoise and metal, is delicately sculpted in low relief, perforated and engraved. Its fragmentary condition has restricted its analysis. A study and conservation plan enabled the recovery of its shape (trapezoidal) and iconographic details. The latter show a supernatural camelid, known as a Wariwilca, standing on a pedestal. The radio-carbon dating of the tray places it at the end of the Middle period (AD 600–1000), which matches the 14C ages obtained for the other five similar specimens excavated in Coyo Oriente, Solcor 3, and Quitar 5, in the San Pedro de Atacama Desert. The Wariwilca figure is also represented on metal votive plaques recovered in Lake Titicaca, as well as on Tiahuanaco ceramic incense burners and stone sculptures. The presence of the tray at Tiahuanaco supports the hypothesis of this type of ritual object being directly imported from the Altiplano center to San Pedro de Atacama, both regions sharing a precise set of ritual practices.

Hosek, Lauren (Syracuse University)

[31] *From Life History to Large Scale: Osteobiography as Microhistory*

Osteobiography, like other types of biographies, extends beyond the individual through entanglements with objects, landscapes, and social phenomena. The approach requires a multi-scalar analysis to understand how bodies both emerge from and create historical process. Osteobiographies are developed by tacking between an individual's remains and the wider skeletal population to establish a contextualized life history. Conceptualizing osteobiography as a microhistory of human remains is one way in which bioarchaeologists may go beyond detailed descriptions of individual life histories recorded in bone. Microhistory, which has been variously defined and employed by historians and archaeologists alike, is here envisioned as the intersections between biography and large-scale and long-term phenomena. In this way, the body is viewed as a node conjoining overlapping temporalities, materials, and biographies, thereby combining the lived experience of an individual with other emergent temporalities and scales. By way of illustration, I present an osteobiography of an early medieval individual from the Czech Republic. The body becomes a site for the coalescence of scales, but also of different forms of evidence, as textual, archaeological, and osteological data inform the analysis. In emphasizing the relational, the historical, and the contingent, a microhistorical approach extends osteobiography beyond the case study.

[31] *Chair*

Hosler, Dorothy

[135] *Discussant*

Hosoya, Leo Aoi (Ochanomizu University, Tokyo)

[211] *Feast as a Farming "Technique": Ethnohistorical Case Studies from Amami and Yaeyama Islands, Japan*

Since the role of feast as a calendar marker for farming communities was proposed by Bender in 1970s, 'practical' roles of feasts in production systems have been debated. In this paper, I argue that feasts can also be considered as a farming "technique" because they can substantially enable regular and continuous farming production by motivating and obliging people for the production, particularly in settings unfavorable for cultivation. In Japan, the southern Amami and Yaeyama Islands were governed by rulers since the Medieval period, and the history shows that when the ruling body well understood the local feasting culture and tactfully used it, its farming management went well, but when the ruling body failed to do that, the management failed. The significance of feasting is so strong in local culture that people today still annually hold large-scale rice fertility festivals although their rice production practically stopped several decades ago due to environmental factors. Furthermore there are recent community movements to revive rice paddies to show their great cultural attachments to the practice. Based on those ethnohistorical case studies, I discuss the fundamental role of feasts.

[177] *Discussant*

Hotaling, Jessica (Boston University), William Saturno (Proyecto San Bartolo-Xultun), Boris Beltran (Proyecto San Bartolo-Xultun) and Shintaro Suzuki (Universidad del Valle de Guatemala)

[321] *The Role of Offerings in Interpreting Maya Mortuary Ritual: Bioarchaeological Analysis at Xultun*

Bioarchaeological analyses in the past have worked to investigate and contextualize human remains in the broader realm of ancient Maya mortuary practices. Offerings are a common component of Maya ritual; however, the role of human offerings is still not understood in its entirety. In the 2014 field season at Xultun, Petén, Guatemala, three sets of human remains were excavated within the Los Arboles structure, a pyramid complex to the north of the site. In this paper, I discuss the results of bioarchaeological analyses of these three individuals in an attempt to further explore the significance of these interments, their relationship to the associated architecture, and the pertinence of women and children in Maya worldviews regarding the afterlife. This paper provides further insight into the maintenance of ritual and ancestral obligations of the Maya at Los Arboles, and more broadly aims to answer questions surrounding the supposedly characteristic nature of mortuary practice in the Maya realm.

Hou, Weidong [72] see Chen, Hui

Houk, Brett A. (Texas Tech University)

[37] *The Digital Evolution at Chan Chich, Belize*

In 2012, the Chan Chich Archaeological Project transitioned from paper field forms to a relational database on iPads in the field and an iMac in the laboratory. Since then, the database has evolved each season, becoming more powerful and more useful with each modification. The project has also adopted Structure from Motion as a standard method for documenting excavations over the past three seasons. The digital revolution has not been without its difficulties, but the evolution of the database and attendant technologies has moved the suite of methods from a novelty to be discussed to a powerful set of tools to be employed. This paper discusses the CCAP database and reflects on the ways it has changed how the project approaches data collection and analysis and how those changes, in turn, have transformed how we interpret the ancient past. The digital data and models allow excavators to reconstruct and consider cultural contexts across multiple excavation units much more easily than traditional paper-based systems do.

Houk, Brett A. [11] see Booher, Ashley

Houle, Jean-Luc (Western Kentucky University) and Michael Rosenmeier (University of Pittsburgh)**[114]** *Climate Amelioration and the Rise of the Xiongnu Empire*

Climate has been debated by historians and archaeologists as one possible contributing factor for the emergence and collapse of complex societies. Recently, connections have been proposed between an ameliorating environment, surplus resources, energy, and the rise of Chinggis Khan's thirteenth-century Mongol Empire. If favorable climate and increased rangeland productivity do indeed play a critical role in the politics of pastoral nomads, then we should be able to observe this in other cases too. This poster presentation evaluates the role that climate might have played in the rise and expansion of the Xiongnu Empire (third century BC to second century AD), using regional-scale archaeological data and climate reconstructions in Mongolia. Our data show a dramatic change in temperature and precipitation in central Mongolia during the Xiongnu period and enhanced productivity in the heartland of the empire. Climatic amelioration could thus have provided ample resources for strengthening the new unified leadership, although the picture is more complex.

Houle-Wierzbicki, Zocha [178] see Auger, Réginald

Houmard, Claire [127] see Britton, Kate

Housley, Caitlyn [10] see Venter, Marcie

Housse, Romuald (Université Paris 1—Panthéon Sorbonne)**[202]** *Fortified settlements of the Upper basin of the Sama River (Tacna) during the Late Intermediate Period (AD 1100–1450)*

During the Late Intermediate Period (AD 1100–1450), the upper valleys of Tacna, between Sitajara and Tarata, are known to have been multiethnic areas of contacts between coastal and altiplano populations. Our research concerns the fortified settlements, called Pucara, to better understand the cohabitation relationships with different scales: from the study of the fortifications themselves to the territory analysis with the identification of the inhabitants of these fortresses.

[202] *Discussant***[202]** *Chair***Houston, Stephen (Brown University)****[391]** *Molded Meaning*

Since the time of Walter Benjamin, scholarship has posed important questions about replication and meaning: what is an "original," what does this imply for "aura"—the particular resonance of unique productions—and are such concepts and concerns solely applicable to industrial production in capitalist society? This session converses with Benjamin, long after his death, by addressing the meaning of replication in precapitalist societies, indeed, outside a Marxian framework altogether. The virtuosity of imagery and texts, their tightly controlled circumstances of reception, and the very meaning of "originals" are studied here, in a session ranging across precolumbian America.

[391] *Chair*

Houston, Stephen [131] see Garrison, Thomas

Hovers, Erella (Hebrew University of Jerusalem) and Anna Belfer-Cohen (Hebrew University of Jerusalem)**[169]** *Are Lithics and Fauna a Match Made in Prehistoric Heaven?*

Lithic artifacts and animal bones form the bulk of the material remains of the Paleolithic. This has led archaeologists to interpret these two types of finds as tethered components of subsistence systems. Differences observed through time and space in the lithic repertoire were considered as functional adjustments, designed to maximize gains from a diverse faunal resource base. While we do not challenge the general notion that lithic artifacts were used (also) for exploiting faunal (and other) resources, we note that significant lithic technological breakthroughs, clearly directed toward higher efficiency of procurement of faunal resources (e.g., hafting, projectile weapons) are few and far-apart in the evolution of material culture. Based on case studies from the Levantine Middle Paleolithic, we question the degree to which fauna-based subsistence determined lithic variability. Current research focus on functional relationship between lithics and fauna may preclude consideration of other causes for lithic typo-technological diversity. These may include technological traditions, differences in cultural transmission processes, or the level of within- and between-group connectivity, various combinations of which may have operated already in the Middle Paleolithic.

[389] *Chair***Howard, Jerry, Christopher Caseldine (Arizona State University), David Abbott (Arizona State University) and David Wilcox (Itinerant Scholar)****[335]** *Mesa Grande and Its World: An Analysis of Intrusive Pottery Types Recovered from Mesa Grande and Their Social Implications*

Mesa Grande, one of the two largest Hohokam platform mound villages in the lower Salt River Valley, Arizona, contains an exceptionally large and diverse excavated sample of intrusive, diagnostic pottery types that have been cross-dated with tree-ring dates in other regions. Complexes of these intrusive types in a stratigraphically defined sequence at the site provide new insight into calendrical age of the mound and its associated compounds, allowing us to test recent suggestions that Mesa Grande was one of the first sites within the valley to be depopulated before the end of the Hohokam sequence. These data can also be used to address whether and when it was reoccupied. Finally, we use the intrusive ceramic dataset to investigate ideological and exchange connections among Mesa Grande and its Hohokam and regional neighbors, providing a basis for reconstructing aspects of the changing social order in the late prehistory of the southern Southwest.

Howard, Joshua (SUNY University at Buffalo), Caroline Funk (SUNY University at Buffalo), Debra Corbett (Nanutset Heritage), Brian Hoffman (Hamline University) and Ariel Taivalkoski (SUNY University at Buffalo)**[257]** *Cutmarks on Prehistoric Alcidae Tibiotarsi in the Rat Islands, Aleutian Islands, Alaska*

The Rat Islands Research Project (2009–2014) examined precontact era Aleut/Unangan archaeological sites on Hawadax and Kiska Islands to test hypotheses about Aleut impacts on and intersections with the environment. The 2003 test excavations at RAT-081 on Hawadax Islands resulted in the recovery of more than 6,000 remarkably well-preserved faunal specimens, which date from 2,500 to 250 years ago and include fish, sea mammal, and bird species. The 2104 test excavation at KIS-050 on Kiska Island resulted in the recovery of more than 10,000 specimens, also dating from about 2,500 to 250 years ago. More than 50% of the faunal materials are avian. Within the avian portion, many of the Alcidae tibiotarsi exhibit cutmarks resulting from

skinning, butchery, or consumption. This poster will focus on the large number of cut Alcidae tibiotarsi and discuss Aleut subsistence and cultural practices by examining the archaeological remains as well as ethnographic sources.

Howard, Nicola

[191] *The Uses of Photomicroscopy for Specimens in Museums*

Do you have a collection of tiny teeth, bones or seeds?? Photomicroscopy might be for you! This poster demonstrates the results of a four month contract position to digitize a small section of the Quaternary Paleontology's collections at the Royal Alberta Museum in 2013/2014. Photomicroscopy is an effective, noninvasive digitization technique for museums and educational institutions to be able to expand the accessibility of collections for display and education purposes. Taking several photos of specimens using a DSLR camera and microscope at multiple focal ranges followed by stacking a small number of photos produces a high resolution photo. The stacking process revealed details not easily noticed when taking a single shot. Later versions of Photoshop or free, open access photo stacking software allows for a high quality photo with minimal time spent in postproduction. Many different types of microscopic specimens and artifacts can be digitized using this technique. This technique allows a museums' professional or volunteer to be able to take thousands of photos and then process them for a clear and detailed photo.

Howard, Steven

[52] *The Karl Site: New Insights on Archaeology in the Upper Allegheny Valley and Life during the Archaic Period*

Most archaeological sites within the upper Allegheny Valley of Northwestern Pennsylvania and Southwestern New York have been heavily damaged by decades of plowing. The Karl Site, while no exception, has revealed that a precious few undisturbed features can exist beneath the ravages of the plow zone. Investigations at the site, involving geophysical survey, controlled surface survey, and limited excavations, have revealed some insights into the function of the site within the broader landscape. Although the majority of the site had been compromised, this study shows that data from such sites can still be useful, and such sites should not be overlooked in academic research. The work has also provided a practical methodology for investigation of heavily plow-damaged sites that provides multiple lines of data collection, and provides a less-intrusive, less time-consuming alternative to plow-zone stripping. Such an approach can be favorable in sensitive areas, and where preservation is the desired outcome.

Howe, David

[287] *Projectile Dysfunction: A Controlled Archery Experiment to Determine the Presence and Replacement of the Bow and Atlatl Technologies in Prehistoric North America*

There is an undeniable trend of a gradual decrease in projectile point size over time in prehistoric North America. About 1,000 years ago (1kya), this morphologic decrease seems to plateau at a very small size, until projectile points were no longer used. Most archaeologists today posit that this sudden change has to do with the invention or adoption of the bow and arrow; however, without a large sample of preserved wooden bows, arrows, or darts, it is difficult to say for certain that this notion is correct. Via a controlled archery experiment, projectile point performance and function will be tested to determine if there is a variable threshold at which large projectile points are no longer functional when fired from a bow, or small projectile points are no longer functional when thrown from an atlatl. Or simply: is there a specific point size or weight that can tell the difference between these point types? A simple analysis as to whether large lithic projectile points can be fired efficiently from a bow was also conducted. These performance characteristics will be tested through use of a mounted bow rig, stone-tipped arrows, high-speed cameras, and ballistics gel.

[287] *Chair*

Howe, Mark (U.S. State Department—USIBWC)

[103] *The Red Bluff Dam Project: A 1930s New Deal Construction Project*

The Red Bluff Project is an earthen dam in Texas on the Pecos River near the New Mexico border. A preliminary geological report of the originally named Angeles Dam Site in Texas by Geologist Kirk Bryan in 1929 found the dam site favorable but he made no conclusion on feasibility. This discussion will talk about the work Dr. Bryan contributed to the later construction of this dam and the later name change to the Red Bluff Project. Emphasis will include the construction of the dam from 1934 to 1936 based on original photos recently found in the IBWC archives. This trove of photos shows the area as it was before the construction of the dam and the region in the 1930s. An historical approach of the archaeology of the now historical dam is examined based on the sites lost with the dam construction.

Howe, Tyler (University of Tennessee) and Kathryn Sampeck (Illinois State University)

[160] *Principles of Cherokee Regionalization and Material Practices of the Pisgah Phase in the Trans-Appalachian Area*

This paper presents ethnohistoric accounts, ethnographic commentary, early colonial cartography, and archaeological evidence to investigate factors affecting processes of regionalization in the southeastern Appalachians. Returning to ethnohistorical theoretical and methodological roots of multisourced data and community co-construction to understand ethnolandscapes, we explore how central tenets of the Kituwah Way, the ethical and cultural principles guiding Cherokee practices, have observable material effects and appear to be of much greater antiquity than has been considered in scholarly literature. Foregrounding research in ethnolandscapes, through regionality, highlights principles of the Kituwah Way, including tohi (steady fluidity in life), osi (neutral or normal state of life), and gadugi (town or community) which contributed to a flexible, resilient, yet integrated network of communities that made initial colonial encounters of a different tenor than other regional Native American communities. We suggest that many social aspects of the Kituwah Way are later interpretations of earlier cultural foundations, much in the same way the material culture transitions of Connestee-Pisgah-Qualla show transformations that hearken to precedents. The regionalization that Mississippianization usually involves is often superfluous, and in other ways, a poor fit for Cherokees. Ethnolandscape approaches show material practices of affiliation, distinction, and regionalization that could be termed meta-Mississippian.

Howe, Tyler [159] see Sampeck, Kathryn

Howell, Cameron (ERM)

[377] *Removing the Present to Model the Past: DEM and Paths in the Sandhills of South Carolina*

Modern infrastructure and development have created problems for reconstructing prehistoric landscapes which adversely affects the accuracy of tools designed to determine trail networks. The attempts to reconstruct prehistoric networks and trail systems between Mississippian period mound sites along different river valleys in the Sandhills region of South Carolina is hampered by even low amounts of development of the landscape. This paper employs some common methods of removing modern disturbances and provides a way of judging the accuracy of the method by comparing paths on adjusted to prehistoric condition landscapes to existing modern infrastructure.

Howey, Meghan [319] see Frederick, Kathryn

Howie, Linda (University of Western Ontario), Heather McKillop (Louisiana State University) and E. Cory Sills (University of Texas at Tyler)
[281] *The Provenance and Technology of Paynes Creek Salt Works Pottery and Briquetage*

The pottery recovered from Late Classic Maya salt works sites can reveal important information about both the production and distribution of this highly valued trade item. Determination of the geographic origin of the serving vessels and storage jars recovered from salt works, for example, provides direct evidence of trade connections to other areas, as well as the geographic extent of the exchange networks through which salt was distributed. From local perspective, the technological characteristics of briquetage offers insight into materials investments in salt production and production strategies. In this paper we present the results of a petrographic characterization study of serving vessels, storage jars and salt-making implements recovered from different salt works sites in the Paynes Creek area. The objectives of this study were to: 1) investigate the geographic origins of different functional categories of pottery, 2) identify locally made pottery and 3) to examine the technological characteristics of ceramic salt production implements from a mechanical performance perspective, thereby generating insight into processing strategies. Here we focus on the nature of briquetage technology and the ceramic evidence of trade connections to different areas of the Maya Lowland region.

Howie, Linda [236] see Peuramaki-Brown, Meaghan

Howse, Lesley (McGill University)

[144] *Late Dorset and Thule Inuit Hunting Technologies and Archaeofaunas: Implications for Societal Differences*

This paper investigates human and animal interaction in two very different hunter-gatherer societies, Late Dorset and Thule Inuit, who once occupied the eastern Arctic. To access cultural differences I focus on how disparate hunting technologies impacted each society's archaeofaunas, and describe what appear to be culturally distinct trends in the faunal remains. In light of these findings, differences between Late Dorset and Thule Inuit hunting strategies, and other societal aspects including labor organization, hierarchy, and prestige are considered. How generalized versus specialized hunting technologies impacted the trajectory of each society is also discussed.

Hreinsson, Viðar [77] see Hicks, Megan

Hruby, Zachary (Northern Kentucky University)

[39] *The Stromsvik Macroblade Cache from Copan, Honduras: A Symbolic Analysis*

Among the myriad types of votive offerings created by the Classic Maya, many contain chipped-stone obsidian and flint materials. These caches often consist of debitage, cores, flakes, blades, and sometimes so-called eccentrics, which are elaborately chipped ceremonial items that sometimes take the form of god effigies. The contexts of these deposits can include the stairways, centerlines, and corners of important structures, below stelae and other monuments, and in the center of royal or elite plazas. Classic Maya caches mark sacred space associated with the five directions as well as celestial bodies, especially the sun at equinoxes and solstices. The cache discussed here was one such cache of obsidian macroblades, flakes, sacrificial knives, and eccentrics. It also happens to be one of the largest obsidian caches in the Maya Lowlands, consisting of over 500 obsidians and weighing over 166 kilograms. This presentation reviews the symbolic aspects of this unique ceremonial deposit from the Grand Plaza of Copan, which was excavated by Gustav Stromsvik.

Hrynick, Gabriel (University of New Brunswick), Susan Blair (University of New Brunswick), Katherine Patton (University of Toronto) and Jesse Webb (University of New Brunswick)

[319] *Wabanaki Foodways in the Protohistoric Quoddy Region: Hunter-Gatherer Continuity, Change, and Specialization in a Changing Social Seascape*

In the context of rapid social or environmental change, foodways offer a way to track how identities are negotiated amid new realities. The Protohistoric period (550–350 BP) in the Northeast was an early site of sporadic and often indirect Indigenous-European contact in North America and the Wabanaki of Maine and the Maritime Provinces were early participants in the world economic system. Analyses of the Devil's Head and Birch Cove sites in Passamaquoddy Bay indicate that Wabanaki diets were becoming increasingly specialized during the Protohistoric period and that Wabanaki people were shifting the seasonality of their occupations, likely to adapt to a new social seascape. Published accounts of peri-contemporaneous faunal remains from the initial French settlement at Saint Croix Island suggest an unwillingness or inability to integrate local foods into Old World foodways despite dietary stress. Yet subsequent French settlers incorporated some Wabanaki foods into their diet, which eventually became a blended and distinct Acadian cuisine. In both cases, foodways may comprise an ongoing way in which people set themselves apart, offering us a window onto the nature of the contact experience in Passamaquoddy Bay.

Hsieh, Ellen (Cotsen Institute of Archaeology, UCLA)

[36] *Placing Intramuros in Global History: Insights from the Ceramic Consumption in Spanish Manila*

Manila was a critical link between Asia, Europe, and the New World during a pivotal period in world history; however, little attention has been paid to its colonial life. This paper aims to fill this void by reexamining consumption patterns of various types of ceramics excavated from sites in the Spanish walled city. The result shows that the Spanish colonists consumed better products than other subordinate groups and demonstrated their power by using customized Chinese goods rather than their home products, which was a traditional political strategy in Southeast Asia. Ironically, these Chinese products were initially developed due to the demand of these colonists' Muslim enemy. Combining the artifacts mentioned above with the indigenous traditional cooking ware and the innovative colonial style tableware, the material culture of Intramuros reveals the hybridity process of Spanish Manila during its early colonial period. This paper enhances the postcolonial discussion in the archaeological study by providing a case that neither the colonists nor the indigenous people, but rather the trade diaspora that dominated trading activities and material culture. It places a local colonial episode to a global framework, where the *longue durée* of each tradition is considered while evaluating the contemporary cultural change.

[36] *Chair*

Hsieh, Ellen [36] see Ueda, Kaoru

Hu, Baohua (Shaanxi Normal University)

[113] *A Kind of Broad-Leave Bronze Spears in North China That Are Similar to the Seima-Turbino Ones*

Through type division of a kind of barbed broad-leave bronze spearheads discovered in North China and analogy analysis with the similar artifacts widely discovered in the Eurasia steppes, we consider they are results of the Qijia (齐家) People in the Gansu-Qinghai area (甘青地区) engaging with the further north Seima-Turbino People. However, based on the feature differences on many aspects between them, we consider the former is not a kind of exotic object, but imitations from the latter. The Gansu-Qinghai area might be its producing area in China; and the four newly excavated bronze spearheads in pit H181 of Xiawanggang (下王岗) site in Xichuan (西川) County are possible to be objects imported from the Qijia culture and then handed down as a kind of foreign assimilated element in the Erlitou (二里头) culture.

Hu, Songmei (Shaanxi Provincial Institute of Archaeology, Xi'an, Shaanxi, China), Miaomiao Yang (Shaanxi Provincial Institute of Archaeology, Xi'an), Zhouyong Sun (Shaanxi Provincial Institute of Archaeology, Xi'an) and Jing Sun (Shaanxi Provincial Institute of Archaeology, Xi'an)

[116] *Research on Faunal Remains from the 2012–2013 Season Excavation at the Shimao Site in Shenmu, Shaanxi*

In 2012–2013, a large number of faunal remains were unearthed from the Shimao site in Shenmu county, northern Shaanxi Province, China. All of these faunal remains were collected scientifically according to archaeological units and were carefully classified, measured and identified. The results of sorting and analysis indicates that there are at least 15 species including the Yangtze alligator, pheasant, rat, *Myospalax fontanieri*, *Myospalax cansus*, rabbit, dog, horse, domestic pig, goat, sheep and cattle. The identified goats are the oldest known cases in China. The identifications of these faunal remains suggest that the climate of the site was damper than at present, associated with large square grasslands, some forests and wetland areas. The economic pattern was semi-farming and semi-pasturing. Domestic animals were the main source for humans to obtain meat, with hunting wild animals only serving as a supplementary source of meat.

Hu, YaoWu (University of Chinese Academy of Sciences)

[117] *Isotopic Evidence of Affinity and Social Classes of Mongolian Noble Family during Yuan Dynasty*

So far, the relationship among Mongolian noble families is scarce due to little findings of Mongolian burials. In this study, isotopic analysis of Mongolian noble tombs was undertaken, aiming to understand the dietary affinity and social classes within Mongolian families. The isotopic similarity and difference was discerned among the population and the reason to account for that was also discussed.

[117] *Chair*

Hu, YaoWu [30] see Fuller, Benjamin

Hu, Yue, Ben Marwick, Weiwen Huang, Jiafu Zhang and Bo Li

[113] *The Lithic Assemblage of Guanyindong: Implications of Technological Cognition of Hominids in Southwest China in Middle-Late Pleistocene*

The Guanyindong site, discovered in 1964, is located in Guizhou Province, Southwest China, dated back to 80–115 ka and 40–190 ka based on two U-series dating (fossil and carbonate samples) results. The 2,323 stone artifacts and numerous fauna fossils were yielded during three main excavation seasons. Here we present the study of 2,272 stone artifacts, which consist of untouched flakes (N = 161) and retouched flakes (N = 1,077), cores (N = 176), chunks and debris (N = 804). The principle raw materials are chert (77%) and limestone (22%). Compared with other sites in south China, Guanyindong is distinctive because of the appearance of the Levallois technique. In the lithic assemblage, we found 59 Levallois flakes and 11 Levallois cores with characteristics that differ slightly from European and African assemblages. In the Guanyindong assemblage, Levallois products have fewer dorsal scars and simpler platform preparation than classical western Levallois artifacts. We use a demographic model to explain why Levallois techniques in Southeast Asia are different from the western. China and Southeast Asia is geographically distant from East Africa where the Levallois technique originated. As hominids dispersed from west to east, progressively smaller populations and drastic differences in environments have influenced the style of the Levallois technique, such as what was observed at Guanyindong.

Hua, Quan [323] see Hendrickson, Mitch

Huang, Tsuimei (Professor at Tainan National University of the Arts)

[26] *Contacts between Chinese Regional Cultures and Northern Grasslands during the Early Bronze Age: A Case Study of Turquoise-Inlaid Ornaments*

The turquoise-inlaid bronze plaques with animal motifs excavated from the Erlitou sites are among the most conspicuous artifacts ever discovered in the Culture. This work explores issues regarding the function and origin of these items, which were worn as ornamental objects at the wrists of the deceased at the time of excavation. Through an analysis of the deposition and placement of these artifacts in the graves, it is speculated that this unique artifact type could be traced all the way back to late Neolithic period. On the basis of available data, this research reviewed the change of these turquoise-inlaid wrist ornaments in relation to turquoise-inlaid body ornaments from prehistoric China dated to periods prior to the second millennium BC, to explore possible interactions between Chinese regional and Grassland cultures.

Huang, Wanbo [78] see Li, Yinghua

Huashi, Liu

[333] *The Neolithic of the Middle Dadu River Valley in Southwest China: Recent Discoveries and New Insights*

In recent years, a large number of Neolithic remains have been found in the middle reaches of the Dadu River in Southwest China, most importantly in the valleys of Hanyuan and Shimian. Excavations conducted at the settlement cluster around Maiping site have led to the discovery of numerous features and object finds displaying strong local characteristics. This paper introduces these finds, highlighting their importance for understanding of local prehistoric developments. The middle Dadu River region forms an independent geographic unit whose early archaeological remains display strong local characteristics, combining a large number of microliths with local-style Neolithic ceramics including jars with decorated lips carrying shallow saw-tooth indentations, appliqué points, and fine corded-ware impressions on the vessel bottom. Considering the strong local characteristics of the assemblages and the dense distribution of similar finds within the region, this facies can be ascribed to the same "Maiping Culture." Based on these recent discoveries of a large number of sites, features, and objects combined with a scientific analysis of the archaeological material, this paper sketches the local cultural development during the middle and late Neolithic.

Hubbe, Mark [143] see Kuzminsky, Susan C.

Hublin, Jean-Jacques [96] see Welker, Frido

Huchim Herrera, Jose [386] see Rissolo, Dominique

Huckell, Bruce (University of New Mexico), Christopher Merriman (University of New Mexico) and Matthew O'Brien (California State University-Chico)

[332] *Boca Negra Wash: Investigating Activity Organization at a Shallowly Buried Folsom Camp in the Middle Rio Grande Valley of New Mexico*
Shallow open-air Folsom sites in central New Mexico have been known for six decades, but have received little investigation; most are known only from surface collection. Their post-occupational geomorphic histories of erosional exposure and reburial, coupled with limited archaeological investigation, pose significant challenges to efforts to examine and interpret Folsom intrasite activity organization. We report on our efforts to detect and make sense of patterning in the distribution of artifacts and bison remains at Locus B of the Boca Negra Wash Folsom site, a substantial portion of which was excavated in 2001–2004. The Locus B artifact assemblage is indicative of a short-term residential camp at which both resource processing and weaponry repair and replacement tasks were carried out. We describe the geomorphic and soil stratigraphic history of Locus B, and then present distributional data on various classes of flaked stone artifacts, point production debris, tool manufacture and repair debitage, and poorly preserved bison remains. These data are analyzed using spatial statistical methods to discern whether traces of cultural patterning in the locations of particular tasks have survived the impact of post-occupational geomorphic processes.

Huckleberry, Gary (Geoarchaeological Consultant)

[110] *Discussant*

Huckleberry, Gary [382] see Caramanica, Ari

Huddleston, Stephanie (Kleanza Consulting Ltd.) and Amanda Marshall (Kleanza Consulting Ltd.)

[394] *Collaboration Continues: Revisiting Archaeology between CRM Archaeologists and First Nations Communities in the Pacific Northwest*
First Nation's heritage concerns are at the forefront of many large-scale and controversial development projects across the province of British Columbia. How developers and Cultural Resource Management (CRM) Archaeologists choose to address these concerns can significantly impact working and political relationships. CRM archaeologists are on the front lines balancing and navigating complex, and sensitive sociopolitical heritage issues. Our small CRM company, Kleanza Consulting Ltd. (Kleanza), has found success conducting collaborative research in this challenging environment. We have learned that in order to conduct meaningful work, archaeologists must be sensitive, adaptable, flexible, and above all must practice a community-based and community-driven approach. This method requires a large investment building relationships among competing CRM companies, academics, contractors, and clients. Researchers must be locally based to gain specialized community knowledge and understanding about how to work within complex, current and traditional sociopolitical frameworks. This presentation revisits and evaluates our company's ability to work collaboratively with First Nation's communities in a CRM context throughout the Pacific Northwest. We evaluate our progress based on a model developed in 2015 and provide specific project examples.

Huddleston, Stephanie [176] see Marshall, Amanda

Hudson, Jean (U Wisconsin- Milwaukee) and Roberta Boczkiewicz (MOCHE Inc.)

[232] *Rooms, Compounds, Alley Dumps, and Neighborhoods: Intrasite Zooarchaeology on Peru's North Coast*
The increasing number of samples of zooarchaeological remains from the prehistoric Chimu settlement of Cerro La Virgen, on the North Coast of Peru, allow a comparison of consumption and discard patterns within and between households and neighborhoods. The information from this analysis adds to our understanding of economic and political realities of life in a community which would have to balance the demands of family consumption and the state tributes requested by the Chimu polity. Of special interest in this crucial scenario of food consumption in a state-level polity is the distribution of remains in floor middens and features in different rooms within a single compound and between alley dumps in different neighborhoods within the larger community.

Hudson, Jean [232] see Boczkiewicz, Roberta

Huey, Samuel [124] see Rees, Mark

Huff, Jennifer (University of Washington)

[374] *Paleoclimate Data and Behavioral Change in the Highlands of Papua New Guinea*

Climate variability generates both opportunities and limitations for subsistence strategies, as well as related settlement patterns and technologies. While not the only driver of behavioral change, climate is a critical force in shaping patterns of past behavior. This paper presents the results of lithic analysis of three sites from the Eastern Highlands of Papua New Guinea that span 20,000 years of occupation. Additionally, the findings from a summed probability distribution analysis of radiocarbon dates and site types are presented. These lines of archaeological evidence are combined with paleoclimate data to construct a robust explanation linking changes in precipitation to changes in site use, subsistence strategies, and related technologies in the highlands of New Guinea from the terminal Pleistocene through the Holocene. Changes in precipitation in the form of general climate trends or changes in the intensity and frequency of ENSO are found to be more closely linked to changes in the archaeological record than ecological changes recorded in the palynological record, or a generic demic expansion model.

[374] *Chair*

Huffer, Damien (Research Associate, Smithsonian Museum Conservation Institute), Duncan Chappell (Faculty of Law, University of Sydney), Lâm Thị Mỹ Dung (Vietnam National University, Hanoi, Vietnam) and Hoàng Long Nguyen (Universität Bayreuth, Germany)

[271] *From the Ground Up: The Looting of Vườn Chuối in Archaeological and Criminological Context*

The exact nature of the illicit antiquities trade from ground to market in Southeast Asia remains poorly known outside of Thailand and Cambodia, where most research has been focused. This paper helps to address this imbalance by documenting and contextualizing looting activities at the Bronze and Iron Age site of Vườn Chuối, located within urban Hanoi. We provide a brief excavation history so as to place looting into archaeological and bioarchaeological contexts, and discuss current and future research on salvaged burials. The methods used to document the recent looting are then discussed, followed by a summation of what little is known about the Vietnamese antiquities trade in general and its relationship to regional trade networks. Finally, we briefly discuss the current regulatory landscape and conclude by discussing how best to protect Vườn Chuối and similar sites in and around Hanoi and continue to raise public awareness of the archaeological repercussions of the trade itself.

Huffman, Thomas (University of the Witwatersrand) and Frank Earley (University of the Witwatersrand)

[175] *Apishapa Rock Art and Soul Capture*

Rather than a western extension of the Plains Village tradition, the Apishapa phase was more likely an eastern extension of the Great Basin Desert culture. Among other things, Great Basin origins explain the Apishapa foraging economy that focused on small mammals, antelope and deer, and meager horticulture. Insubstantial structures and temporary rockshelter habitations attest to residential mobility. As others have noted, Archaic rock art in the Great Basin and Apishapa areas are remarkably similar. Abstract curvilinear and rectilinear styles in both areas share several motifs and combinations. We use Great Basin ethnography to discuss abstract rock art at the mouth of the Apishapa canyon in southeast Colorado. Pilgrimages and the Great Basin version of shamanism, especially the concept of soul capture, help to explain Apishapa 'maps.'

Huggett, Jeremy (University of Glasgow)

[37] *Archaeology's Digital Interfaces*

Computing devices have been increasingly used by archaeologists since the 1950s, their adoption accelerating significantly since the 1980s with the availability of personal computers. What is the nature of this changing relationship and what are the implications for archaeology (and computing)? These questions will be addressed through the metaphor of the interface. We are accustomed to the textual and graphical user interfaces as a means of negotiation between archaeologist and computer, but how else does an interface operate beyond the visual and the obvious? An interface separates and brings together. It limits and reveals. It restricts and enables. It excludes and includes (Hookway 2014:4). An interface operates simultaneously in the technical, social, and political realms. What does a consideration of digital interfaces expose about the consequences of archaeology's relationship with the computer, an association which has developed across barely a generation?

[149] *Discussant*

Hughes, Kate [89] see Wurster, Bethany

Hughes, Richard

[79] *Discussant*

Hull, Bryna (University of California, Davis), Jelmer Eerkens (University of California, Davis) and Reba Fuller (Tuolumne Me-Wuk)

[381] *Adaptive Dietary Response to Long-Term Drought: Diachronic Stable Isotope Evidence from the Central Sierra Nevada, California*

This study examines human dietary responses to the Medieval Climatic Anomaly (MCA), an extended period of warmer and drier environmental conditions from AD 900–1300, in the Central Sierra Nevada Mountains of California. Stable isotope and radiocarbon analyses of human remains attributable to the Tuolumne Me-Wuk reveal individual-level dietary behaviors. Results show a region-specific "Central Sierran" pattern of resource use in the form of a distinctive isotopic signature relative to other areas of California. Radiocarbon dates reveal gradually changing diets over time, but with a marked decrease in trophic level, decreased use of pine nuts, and interindividual homogenization coinciding with the MCA, suggesting significant dietary stress and resource intensification. Further stable isotope analyses of serial sections of teeth from individuals who lived before, during, and after the MCA are used to examine more fine scale dietary changes over individuals' lifetimes. The data illuminate broad-scale human behavioral adaptation to changing climatic conditions, particularly interindividual variation and differences between age groups and the sexes.

Hull, Emily (Hamilton College), Nathan Goodale (Hamilton College), Alissa Nauman (Hamilton College) and David G. Bailey (Hamilton College)

[343] *Microwear Analysis of Mica Lamented Quartzite Scrapers from Slocan Narrows, Upper Columbia River Area*

Ethnographic evidence suggests that semi-sedentary hunter-gatherers in the interior Pacific Northwest inhabited aggregated winter villages on a multi-season basis and specific times throughout the year much of the group made long distance forays for resource procurement, trade, and exchange. Extensive excavation efforts at the Slocan Narrows Pithouse Village has produced an assemblage of mica lamented quartzite scrapers. This study presents findings from analysis and characterization of microwear on these tools in order to infer their potential function. We also conducted experimental studies using the same quartzite on several contact materials. The experimental tools were used in blind tests. This analysis allows for a better understanding of why aboriginal peoples would transport quartzite scrapers over 200 km up the Columbia River from Kettle Falls, WA, to Slocan Narrows, BC.

Hull, Kathleen (University of California, Merced)

[42] *Splitting and Lumping: Decision-Making and Meaning in Intentional Artifact Fragmentation and Deposition*

Drawing on archaeological data from the greater Los Angeles Basin, this paper examines sequences of intentional ground-stone artifact fragmentation and singular or multiple-recombined fragment placement within various feature contexts. Recent studies of putative communal mourning features have indicated an initial suite of intentional artifact fragmentation and treatment practices including pigmentation or burning, but ongoing study of these and other types of features has revealed additional practices that suggest acts designed to produce fragments of particular types (e.g., specific portions of tools) and/or a desired number of pieces that could be distributed individually or recombined in particular configurations for placement within one or more features. The potential significance and meaning of such splitting and lumping with respect to certain feature types is explored.

Hulme-Beaman, Ardern [85] see Ameen, Carly

Hulse, Eva (Archaeological Investigations Northwest) and Sarah L. Dubois (Archaeological Investigations Northwest)

[387] *Head for the Hills: Resource Specialization in the Prehistoric Portland Basin*

In the Portland Basin north of the Columbia River, the oldest sites (5000 years BP and older) tend to be larger than younger sites, have a more diverse array of artifacts, and lie in upland areas. Sites post-dating 5000 years BP vary in size, tend to have specialized artifact types, and are found at a wide

range of elevations. We hypothesize that the lack of older sites at lower elevations is due to changes in subsistence strategies, rather than differential preservation of older materials. We approach the question using archaeological and paleoenvironmental data collected primarily from the Camas/Washougal area in Washington, supplemented by data from other parts of the Portland Basin.

Humes, Cynthia (Claremont McKenna College)

[212] *Hindutva's Rediscovery/Appropriation of Its Ancient Past*

Religious proponents are increasingly challenging academic research on India and its religious past. Book burnings, petitions, and even riots, have resulted when religious adherents have felt maligned by the scholarship of academic archaeologists and historians. In my presentation, I will introduce and clarify the complicated history and major debates regarding key archaeological finds in South Asia. In particular, I will discuss debates regarding the history of the "Aryan" and the Indus Valley Civilization. I will elucidate ideologically-inspired interpretations of the South Asian archaeological record, particularly by those called Hindutvādins, and those who write, blog, and speak about (and against) them. I next describe some of the major controversies that in the past several decades have flared into increasingly virulent interactions between Hindutva proponents, indigenist theorists, and academic interpreters. I then highlight major accusations by academics of partisan pseudoarchaeology and pseudoscience, and close with comments regarding what these debates foretell of the future of Indus Valley archaeological scholarship.

Humphreys, Stephen (Durham University) and Clarissa DiSantis Humphreys (Durham University)

[122] *Operation Nightingale USA: Archaeology as a Vehicle for Peer Support in the Veteran Community*

The potential archaeological fieldwork holds for facilitating positive change among disabled military veterans has only recently begun to be explored. Since 2012 three dedicated veterans' archaeology programs have been developed within the United Kingdom (Breaking Ground Heritage, Operation Nightingale, and Waterloo: Uncovered), and one has been created within the United States (Operation Nightingale USA). These programs share an interest in integrating disabled serving and ex-service personnel into a supportive new community, providing them with transferable skills that may or may not lead to a career in archaeology, and increasing wellbeing by providing a sense of purpose. They draw upon methods developed and refined in veteran support organizations over the last decade, emphasizing in particular the value of formal and informal peer support. At the same time, veterans' archaeology programs provide an opportunity to expose a new demographic to the value of cultural heritage. This paper will discuss the application of best practices derived from veteran support organizations to archaeological project organization and field practice, focusing specifically upon the joint Operation Nightingale/Operation Nightingale USA 2016 field season at Malton, North Yorkshire.

Humphris, Jane (UCL Qatar) and Michael Charlton

[203] *Early Iron Production in Sudan*

Since 2012 archaeometallurgical investigations have been undertaken at the Royal City of Meroe, a capital of the Kingdom of Kush situated c. 250 km north of modern day Khartoum, Sudan. During the research, a chronological history of iron production at this site has been generated that spans at least one thousand years. Insights into various stages of the chaîne opératoire of iron production have also been revealed, including the location and techniques of iron ore extraction, the procurement of charcoal, the production of technical ceramics, and insights into the smelting parameters such as furnace design. This paper presents new data concerning the earliest remains of iron production found so far at the site. The material has recently been excavated toward the lowest levels of the largest slag mound at Meroe, and includes iron slag, charcoal and tuyere fragments. This material may date back to the Napatan period or earlier; new radiocarbon dates will also be presented. The results of laboratory analysis of the excavated material are contextualized within the framework of Kushite history as well as African ferrous metallurgy.

Humphris, Jane [203] see Charlton, Michael

Hung, Hsiao-chun [208] see Carson, Mike

Hunstiger, Matthew

[42] *Three Dimensional Aggregate Flake Scar Analysis on Experimental Lithics, and Archaeological Lithics from Tabun Cave, Israel*

Dorsal flake scar directionality is used in lithic analysis to infer methods of core reduction and flake production. This has been done in two dimensions. This study analyzes flake scars at the assemblage level in three dimensions. I use both experimental assemblages (bifacial, blade, discoidal, and levallois) as well as archaeological samples from Tabun Cave, Israel, an important reference sequence (partly defined by scar patterning) for the Levantine Paleolithic. Experimental samples provide a comparative baseline with known production methods. The samples from Tabun Cave represent Units I and IX, respectively Tabun C-type and Tabun D-type, and some of their respective beds. Results from the experimental samples' scar analysis suggest different methods of reduction are distinguishable in some cases. Results from the archaeological assemblages suggest some assemblages are indistinguishable, e.g., the two Beds from Unit I, while other comparisons, e.g., between Units I and IX as well as between some of the Beds within Unit IX, suggest the utility of the new method to differentiate archaeological samples by their 3D scar pattern variables. In particular, the ability of the method to distinguish between individual beds within Unit IX calls into question the legitimacy of treating Tabun "types" as monolithic categories.

Hunt, Alice (University of Georgia)

[79] *Social Function, Semiotic Meaning, and Community Identity, or Sometimes a Pot Is Not Just a Pot*

The spread of "Palace Ware," an eighth–seventh century BCE drabware, across the Neo-Assyrian imperial landscape coincides with the annexation of territory and establishment of vassal states and buffer zones throughout the ancient Near East. Consequently, Palace Ware has been considered 'imperial' material culture and equated with imperial identity. This unilateral, top-down interpretation reduces material expression of complex interregional, intercultural interaction into either imposition or emulation. In this paper, we take a more nuanced approach to the transmission of Palace Ware. Imperial interactions are context specific, recursive relationships negotiated through material culture and symbols of identity and power. If Palace Ware served as a medium through which Neo-Assyrian imperial relationships were established, justified and maintained, it is important to understand (a) how it was transported across the empire; and (b) who consumed Palace Ware both inside and outside the Neo-Assyrian heartland. In the process of answering these questions, using morphometric, petrographic and geochemical data, we are able to evaluate subtle changes in the social function and semiotic meaning of Palace Ware across the Neo-Assyrian imperial landscape and better understand the nature of these relationships.

Hunt, David, Marcos Llobera (University of Washington) and Jacob Deppen (University of Washington)

[118] *Getting More from Survey: A Case Study from the Western Mediterranean (Mallorca, Spain)*

In this paper we present preliminary results of three campaigns of intensive survey carried out as part of the ongoing Landscape, Encounters and Identity project being undertaken in the NE of the island of Mallorca (Spain). The project is uniquely situated to explore the confluence of various

archaeological evidence (surface scatters, lidar, 3D photogrammetric models) and the interpretative challenges these pose. Our paper here will focus primarily on the results recovered through intensive field walking, and the impact that technology has had on these. At a broader theoretical level, we seek to reflect on the nature of information recovered through this type of practice, the challenges and potentials that it offers to study people and their surroundings, and the role that technology plays to promote and/or overcome these. We view this as part of a larger conversation on the interpretative perspectives that different types of material evidence bring to the study of past landscapes.

Hunt, Garrett [4] see Cooper, H. Kory

Hunter, Raymond (University of Chicago) and Steve Kosiba (University of Minnesota)

[331] *Land, Labor, and Status: A Perspective from Colonial Cusco, Peru*

Access to land is an important marker of status in agrarian societies. During the Andean Late Horizon (c.1400–1532), land differences grounded status distinctions: nobles developed monumental estate farms and kin-oriented communities collectively administered patchwork fields. Under the Spanish colonial system (1532–1824) access to land and labor came to differentiate status in new ways. Spaniards appropriated labor and property, while indigenous nobility contested Spanish rule and staked new claims to authority by advocating for control of lands that had been Inca estates. During these decades of social crisis, many Andeans detached themselves from traditional lands, becoming itinerant outsiders (forasteros), or landless laborers (yanakuna). Little is known about these new categories of subjectivity and their impact on the Andean social landscape. In this paper we treat land as a category of material culture that can render status legible to archaeologists. We consider the circumstances under which social actors might sever ties to land, a political tactic to create an inconspicuous way of life beneath the scrutiny of state authorities. Archaeological survey data, GIS analysis, and historical documents provide evidence of how Andean people sought to define their land and their identity in early colonial Cusco, Peru.

Huntington, Yumi (Jackson State University) and John Warner (University of South Florida, Sarasota-Manatee)

[359] *Jequetepeque-Jatanca Acropolis as a Mesocosm: The Role of Architecture during the Late Formative Period*

Jequetepeque-Jatanca, located on 3 km away from Cerro Cañoncillo, was occupied during the late Formative period by several successive cultures suggesting that it was a site of consistent religious and political importance to many different societies. The Jatanca archaeological complex consists of an Acropolis, the oldest and only elevated structure, along with five compounds that are distinguished by their sizes and dates of construction. Among all, the Acropolis is the most important, due to its shape and location. My paper argues that the Acropolis itself becomes the center of power, namely as an astronomical observation point. Viewed from the Acropolis, Cerro Cañoncillo serves as a calendrical mountain, marking the summer and winter solstices with sunrises at the left and right extremities of the mountain. As the viewing point, the Acropolis becomes the nexus where natural cosmic cycles are translated into the mundane realm of human life, a kind of mesocosm that re-creates the structure of the sacred mountain mimetically even as it takes command of that power for human use. Using Starry Night Pro 7, I show illustrations of the calendrical functions of Cerro Cañoncillo and the mediating role of the Acropolis in the context of the Jatanca site.

Huntley, Deborah (Tetra Tech, Inc.) and Cynthia Herhahn (Bureau of Land Management)

[129] *Rio Grande Glaze Ware Knowledge Scapes*

Research by Katherine Spielmann and many of her students highlights the economic and social significance of glaze-decorated ware vessels during the fourteenth through sixteenth centuries AD. We take a new approach to Rio Grande Glaze Ware in this paper, examining the role of knowledge scapes in structuring economy in Ancestral Pueblo middle-range societies. Knowledge scapes encompass economic, social, technological, and ritual aspects of glaze ware production, use and exchange. We explore the origins and development of glaze ware knowledge scapes from the initial creation of the technology, its subsequent spread through networks of information exchange, to the eventual regionalization and standardization of glaze paint recipes. The locations of lead ores and temper sources and their social contexts provide the physical tie between spheres of knowledge and the landscape itself. We emphasize variability in age, gender, skill, and social identity that characterized glaze ware knowledge scapes.

Huntley, Deborah [303] see Trautwein, Emily

Huntley, Jillian (Place, Evolution and Rock Art Heritage Unit Griffith University), Steven George (Earth Sciences, Macquarie University, NSW, Austral), Mary-Jean Sutton (Virtus Heritage, Pottsville, NSW, Australia) and Paul Tacon (1. Place, Evolution, Rock Art Heritage Unit, Griff)

[375] *Second-hand? Paint Chemistry and the Age, Authenticity, and Conservation/ Management of Hand Stencils from the Sunshine Coast, Queensland, Australia*

The materials used to create rock art preserve information regarding how, and in some instances when, it was made. Here we outline the field based, geochemical study of three white hand stencils on the Sunshine Coast of Queensland, Australia. Portable X-ray fluorescence analysis determined that the stencils were made using a titanium dioxide pigment, almost certainly commercially produced white paint. Significantly, this helped us assign a chronology as the rock art must have been produced after the European colonization of Australia. The amount of titanium in the paint reflects a twentieth century recipe (specifically >1960) rather than a modern, twenty-first-century paint. The manner in which the stencils were made are consistent with Aboriginal rock art across the continent. Rather than a pastiche of Aboriginal art made by European Australians, we suggest that these stencils provide rare insight into the continuing cultural traditions of Indigenous peoples during the mid-1900s. We conclude by outlining the implications of the materiality of these hand stencils for their preservation and ongoing site management.

Hurst, Heather (Skidmore College)

[392] *The Black, The Red: A Study of Two Maya Mural Pigments from the Petén Region*

Black and red are foundational colors in Mesoamerican painting and scribal arts, often derived from easily accessible raw materials. Although their presence is ubiquitous, variations in chemistry and microscopic properties are data that tell a more nuanced story. This paper summarizes analysis of black and red colorants used in Maya wall paintings that contribute to observations regarding local traditions in manufacture, as well as individual variation in artistic practice. Reported results focus on the characterization of materials and methods used in mural manufacture at Cival, La Sufricaya, San Bartolo and Xultun (Guatemala), over a period of 1,000 years. Multiple lines of evidence including stylistic, chemical and materials science analyses considered within the context of current preservation and observed degradation are integrated in order to understand raw materials used to produce colorants, as well as the methods of preparing wall substrates including plaster and paint application and/or finishing. Collaborative and inter-disciplinary research provided insight into artistic attribution, workshop practice and decision-making (raw material selection and processing, time allocation, etc.) in Maya mural painting from the Petén region.

[392] *Chair*

Hussey, R. Scott (University of Florida)**[203]** *Enslaved Christian Captives in Early Modern North Africa: Resolving Historical Contentions through Archaeology*

Establishing estimates of European Christians enslaved in North Africa during the Early Modern Period (1500–1800) is highly contested among scholars. On one hand, historian Robert Davis argues that more than a million Europeans were captured, enslaved, and left unransomed in North Africa in the Early Modern period. On the other hand, Nabil Matar suggests that both the historical accounts and Davis' estimates are exaggerated, in part because of a lack of physical evidence and the ambiguous characteristics of known and remaining prisons for Christian slaves in North Africa. During historical archaeological research into enslaved Christians in North Africa, I excavated a separate sealed subterranean dungeon associated with Christian slavery Morocco: the Mazmorras of Tétouan, Morocco. My archaeological research corroborates historical accounts of Christian slavery through archaeological evidence. Building on these links allowed me to situate the Mazmorras' within local networks of capture and ransom between Spain and Morocco. In establishing a strong association of archaeological evidence with archival sources and primary texts, this research helps to resolve a decade-long historical debate about enslaved Christians while orienting Tétouan within a larger system of ecclesiastical and royal power as well as interfaith relations in the Early Modern Mediterranean.

Huster, Angela (Arizona State University)**[322]** *Characterization of Local and Aztec Rule at Calixtlahuaca*

The Aztec Empire has been characterized as both an example of relatively indirect rule and as a case of relatively collective rule, positions which are least superficially opposed. In this paper, I use ceramic data (INAA, petrography, and type classification) from multiple contemporaneous households at the provincial capital of Calixtlahuaca in the Toluca Valley to evaluate these two positions. I compare data from the time periods during which the site was under local rule and when it was incorporated into the Aztec Empire. I find that the preexisting local rule was likely relatively collective. Aztec imperial rule, while relatively indirect, did result in some reduction in the collectiveness of rule. This study illustrates the importance of separating local governance traditions from imperial rulership strategies.

[322] *Chair***Huston, Melyssa (Petrified Forest National Park), Christine Mikeska (Boston University) and Catherine F. West (Boston University)****[144]** *Food or Fur: Dog Butchery on Kodiak Island, Alaska*

Archaeological evidence suggests that domesticated dogs (*Canis familiaris*) have been in the Kodiak Archipelago of Alaska for at least 7,000 years. Despite their lengthy presence, little is known about their relationship with Kodiak's human inhabitants. Based on both western assumption and the limited ethnohistoric record for this region, it is commonly assumed that people simply kept dogs as pets. However, previous studies of dog remains from the Uyak site on Kodiak Island note the presence of cutmarks on many of the bones. These observations suggest that the role of dogs in the lives of people may be far more complicated than previously assumed. Even more, cutmarks suggest that dogs may have been used for their fur or meat. Through systematic analysis of cutmarks found on these bones, we demonstrate that some dogs were dismembered and defleshed. Based on these results, we argue that these dogs were likely butchered for meat consumption.

Huston, Melyssa [304] see Erickson, Katrina

Hutchinson, Ian, Sarah L. Sterling (Anthropology, Portland State University), Virginia L. Butler (Anthropology, Portland State University) and Carrie Garrison-Laney (Earth and Space Sciences, University of Washington)**[228]** *Washed Away? Was Tse-whit-zen Deserted in the Aftermath of Cascadian Earthquakes?*

The northern segment of the Cascadia subduction zone has ruptured at least four times in the last 2,000 years. Each of these giant earthquakes triggered a tsunami that potentially inundated the Tse-whit-zen village site to depths of 3–6 m and exposed it to currents of ~10 m/s. We compare the timing of these tsunamis, as recorded by wash-over deposits at Tse-whit-zen and sand sheets in the marshes at Discovery Bay, some 50 km to the east of Tse-whit-zen, with the paleodemographic history of the village. The latter is modeled using the probability density of AMS radiocarbon ages as a population proxy, and tested against a null model derived from the IntCal13 calibration database. The results suggest that the size of the population at Tse-whit-zen oscillated wildly in the 1,500 years before European contact, with minima in the wake of each of these natural disasters.

Hutson, Scott [329] see Kidder, Barry

Hvidberg, Madisen (Simon Fraser University) and Dennis Sandgathe (Simon Fraser University)**[90]** *Investigating the Modeling of Neanderthal Population Size*

Developing some understanding of how many hominins occupied the landscape at any one point in prehistory can provide important insights into basic behavioral patterns, how these differed between hominin species, and how they changed over the course of the Pleistocene. Population density is an important factor in subsistence behaviors, mobility patterns, and the nature of group interaction. A number of approaches have been used by researchers to provide estimates for effective Neanderthal population size across Eurasia: quantifying the Middle Paleolithic archaeological record, quantifying genetic variability, and paleodemographic modeling. Given the huge area that the species occupied and compared to other top carnivore species, all published estimates for Neanderthal population size and density are surprisingly low. This suggests that this topic should be explored in more depth. Here we focus on the paleodemographic modeling approach, which relies on developing effective birth and death rate values for an extinct hominin species. In order to put these numbers into perspective, data from modern hunter-gatherers and other top carnivore species living in similar regions were used as points of comparison. It was found that Neanderthals are commonly estimated to have had populations over twenty times less dense than these modern analogs.

Hyde, David G. (UC Berkeley)**[19]** *Let's Hear It for the Boy: Masculinity, Manhood, and Archaeologies of Gender*

This paper will seek to explore how archaeological investigations of masculinity and manhood can contribute to contemporary theory on gender and sexuality. Drawing on material from a nineteenth century industrial work camp in Coastal California, I will argue that intersectionality provides promising avenues as both a theoretical paradigm and as a way to articulate archaeological work within a wider, multidisciplinary discourse on gender. Methodological implications for archaeological engagements with masculinity and intersectionality will also be explored.

Hyde, David M. (Western State Colorado University) and Michael Stowe (U.S. Department of Defense)**[11]** *Settlement Pattern Analysis at a Hinterland Community in Northwestern Belize: Results of the Medicinal Trail Reconnaissance and Mapping Project*

The Medicinal Trail Reconnaissance and Mapping Project (MTRAMP) began in 2013 and just completed its fourth season in 2016. Those four seasons, plus the integration of previous mapping endeavors, has refined our understanding of the size and distribution of households and numerous landscape features that have been, or continue to be, the focus of excavations. Intensive survey and mapping of the Medicinal Trail locality has revealed, (a) that the largest, and most complex architectural groups are associated with ridge tops, (b) artificial drainages and reservoirs are associated with dense settlement, and (c) numerous terraces are located on the slopes of the ridges, near drainage features. In this paper we will present the results of the MTRAMP and provide a discussion as to their function and relation to the sociopolitical dynamics of the community.

Hyde, David M. [7] see McDonough, Heather

Hylkema, Linda

[60] *Weaving the Strands of Evidence: Multifaceted Confirmation of Textile Production and Use at Mission Santa Clara de Asís*

Mission Santa Clara de Asís, founded in 1777, is one in a chain of 21 Spanish Colonial missions established along the coastal region of Alta California. Recent excavations within Santa Clara's Native American Ranchería have revealed a plethora of objects directly and indirectly associated with textile production and use within the colonial setting. Indigenous practices from ethnic regions of California and Mexico are reflected within the assemblage of sewing/weaving tools, adornments, faunal remains, and the remnants of fabric, fibers, basketry and cordage themselves. Our paper aims to highlight the persistence of native textile traditions that clearly played an important role in the domestic and economic success of Mission Santa Clara.

Hynek, Scott [8] see Buckley, Gina

Iannone, Gyles (Trent University)

[136] *Merit Making at Ancient Bagan, Myanmar: A Consideration of Socioreligious Entanglements and the Rise and Fall of a Classical Southeast Asian State*

Much of the recent discourse surrounding the collapse of archaic states is centered on the impacts of ecoside or climate change. Driven by natural scientists and increasingly sophisticated data generation and analysis methods, such environmentally-based approaches to collapse have tended to gloss over the myriad cultural factors also involved in such severe transformations, thus inhibiting our ability to fully grasp the complexities of the collapse process in the various case studies currently under archaeological scrutiny. This presentation underscores the importance of including considerations of both religion and ritual in our interpretations of sociopolitical collapse, using insights from the rise and fall of Bagan, Myanmar's "classical period" capital. The focus of the discussion will be on the roles that Buddhist merit making played in Bagan's development and denouement, with specific attention to the various ecological, economic, social, and political entanglements that resulted from ideologically charged donations to temples and monasteries.

[214] *Discussant*

Iannone, Gyles [214] see Baron, Natalie

Ibarra, Emilio and Laura Ortiz-Tenorio

[53] *Los microrrestos botánicos (polen) en ofrendas y rellenos constructivos del área de Tlaltecuiltli*

Dentro de la gran cantidad de material arqueológico recuperado en la Séptima Temporada del Proyecto Templo Mayor se encuentran los microrrestos botánicos, elementos que al reflejar la flora regional nos permiten inferir sobre las actividades de tipo rituales y sagradas realizadas en torno a Tlaltecuiltli al pie del Templo Mayor. Esto cobra importancia si recordamos que para el pueblo Mexica, las plantas jugaban un papel importante en su cosmovisión, relacionándose no sólo con elementos como la guerra, la fertilidad, el sol, sino también en varios casos, se asociaban con deidades específicas, como en el caso de Tláloc y el yauhtli. Para determinar qué tipo de plantas eran utilizadas y el por qué de su presencia, se realizó el análisis del polen, siendo de relevancia su presencia tanto en las ofrendas como en los rellenos, puesto que estos últimos, al informarnos sobre la flora común en la época prehispánica, nos permite establecer un margen de comparación para detectar elementos atípicos y exóticos en las ofrendas.

Ibarra, Emilio [174] see Ortiz, Laura

Ibarra, Thania (Universidad de las Américas Puebla) and Aurelio López Corral (Centro INAH-Tlaxcala)

[7] *Thread Production in Late Postclassic Tepeticpac, Tlaxcala: A Technological and Experimental Study of Archaeological Spindle Whorls*

Textile production was one of the most valuable social and economic activities in prehispanic Mesoamerica. In this study, we inquire into thread production in the site of Tepeticpac, Tlaxcala, one of the main altepeme of Late Postclassic Tlaxcallan, using a technological, ethnoarchaeological and experimental analysis. In particular, we evaluate key attributes of archaeological spindle whorls in the spinning process, including weight, shape and moment of inertia. With the collaboration of three craftswomen (zapotec and otomí), we performed an experimental study of thread production using replicas of archaeological spindle whorls and different types of fibers. Preliminary results show that although there is a certain correlation between the size of the spindle whorl and the quality of thread produced, it is the ability of the craftswoman and the spinning technique that determines its final quality.

Ibarra López, Marcelo (Centro INAH Michoacán)

[12] *Use and Symbolism of Copper Axes in Tarascan Society during the Late Postclassic Period in Modern-Day Michoacán, Mexico*

The cultural core of the Tarascan society settled in the region of what is now Michoacán, western Mexico. For the Tarascans, gathering firewood was a sacred activity, and the maintenance of a never-ending fire within their temples or "cues" was an essential part of their religion. This sacred element was an offering for their most venerated god, Curicaueri. Collecting wood was an activity so sacred that even the tools used to retrieve it were transformed into consecrated objects sharing the same taboos as the sacred firewood itself. This work is about how copper axes became depositories of status in Tarascan society. Through an analysis of the specific use of the ax, the individuals who used them, and the different raw materials used for manufacture, I will analyze how each factor contributed to the significance of copper axes and shaped their role within Tarascan society and their vision of the world.

Ibarra López, Miguel Alberto (Centro INAH Michoacán)

[12] *A Paleopathological Analysis of Skeletal Remains Uncovered in La Cueva de los Hacheros, Turicato, Michoacán*

This poster deals with the study of skeletal remains belonging to eighteen individuals deposited within La Cueva de los Hacheros, a site located in the municipality of Turicato, Michoacán. Unfortunately, as a result of looting by landowners, the site has an altered context. Despite that fact, a salvage excavation and a comprehensive analysis of the remains yielded valuable data for interpreting the site and learning more about the individuals buried within. The skeletal analysis made it possible to recognize various pathologies including antemortem trauma, diseases, and developmental anomalies, some of which were represented in various individuals. This investigation also provided us with sufficient data to register the total number of individuals and differentiate them by age and sex. This investigation will provide a better understanding of those whose final resting place was at La Cueva de los Hacheros and the diseases that afflicted them.

Ibarrola, Mary Elizabeth (University of Florida)

[74] *Resistance and Intersectionality in Maroon Archaeology*

We define Maroons by their overt resistance; theirs was one of the most extreme forms of anti-slavery opposition in the Americas and for many scholars is representative of the human desire to be free. However, defining Maroons by the act of marronage is isolating and limits attempts to study cultural continuities and ethnogenesis among the wider African Diaspora. This paper will look at the potential for, and advantages of, an intersectional maroon archaeology. Through the lens of marronage in Florida, and comparative analysis of three Florida sites—a slave cabin at Bulow Plantation in east-central Florida, an urban slave site at 71 Park Place in St. Augustine, and the Maroon settlement of Peliklikaha in central Florida, all of which date from the late Second Spanish Period—the paper will address the ability of intersectionality to both challenge our understanding of marronage and to build more complex comparisons of Maroon, slave, and free black societies in the colonial world.

Ichikawa, Akira

[236] *A Revised Chronology of the Southeastern Maya Area: an Evaluation of New and Existing Radiocarbon Dates from the Preclassic to Postclassic period*

The establishment and refinement of chronology is a critical issue in archaeological practice worldwide. In the archaeology of the southern Maya area, Inomata et al. (2014) have currently proposed a new revised chronology for Kaminaljuyu, Guatemala, especially for the Preclassic period, using several calibrated radiocarbon dates and Bayesian statistics. They also highlight a new interpretation of the social process in southern Maya area. However, the dataset for the southeastern Maya area, especially that located in the western part of present-day El Salvador, has not been updated since the 1970s and 1980s. This paper shows the latest updated radiocarbon dates for the southeastern Maya area. These include more than 100 dates collected from Chalchuapa, which is a key site in the region, and other sites by applying Bayesian statistics to further better the chronology. Based on this data, I present an enhanced local chronology from the Middle Preclassic to the Late Postclassic period. Furthermore, although it requires minor revisions, I support the validity of the chronology proposed by Inomata et al.

Iles, Louise (University of Sheffield)

[161] *The Spread of Iron Metallurgy: The African Continent*

Theories of the origin(s) of iron production and the spread of ferrous technology have provoked many decades of lively and enduring debate. The notion that iron production developed in one core location—from where knowledge of it spread—has been challenged by claims of early, independent inventions of iron production in Africa, India and China. However, it has proved problematic to verify the timing and contexts of these multi-origin hypotheses without placing undue emphasis on isolated radiocarbon dates. This research reopens the discussion of the origins and spread of iron production using summed probability distributions of published radiocarbon dates as a proxy for technological activity. It aims to investigate the broad-scale dynamics of the spread of iron metallurgy through the whole of the Old World, exploring some of the socioeconomic factors that influenced the movement of knowledge, and considering the impact of iron production on the environments where it flourished. The research began in 2016 with the collection of published radiocarbon dates from Africa, and this presentation introduces and considers the results of the initial analysis of the African dataset.

Ingalls, Victoria (University of Texas at San Antonio)

[369] *A Place for the Living, A Place for the Dead: Social Memory at the Ancient Maya Hinterland Community of San Lorenzo, Belize*

Public structures across the Maya lowlands functioned as materializations of ideology, memory, and identity. However, documentation of public ritual structures is typically limited to formal ceremonial centers. Little is known about public spaces within hinterland communities. Excavations at the site of San Lorenzo offer insight into the use and transformation of ritual space within a hinterland community. Recent excavations of a public structure group have uncovered multiple construction phases beginning in the Preclassic and culminating in the Terminal Classic. The Preclassic phase of these structures is a round platform resting on a tamped marl surface. Due to its size and form, comparative data suggests that this platform may have functioned as a space for public ritual. Excavations have further uncovered seven interred individuals within the patio space of the Late Classic construction phases. Thus, by the Late and Terminal Classic periods, this site became a burial ground. The transformation in use and the continual reconstruction of ritual space over centuries suggests that this site served as a space of social remembrance and identity on the landscape of the San Lorenzo community.

Inomata, Takeshi (University of Arizona)

[217] *Maya Palaces at Aguateca and Ceibal, Guatemala*

Royal palaces at the medium-sized centers of Aguateca and Ceibal appear to represent a basic template for the spatial and functional configurations of Maya palaces. They exhibit simple square forms resembling smaller residential groups of lower status, indicating their primary function as residential complexes of the royal families. Administrative and ceremonial functions were likely merged with domestic ones. These palaces also provide information on the degree of spatial mobility. While the Maya were generally attached to fixed residential localities, they allowed a certain level of residential mobility. The royal palaces of these dynasties moved through their history, depending on administrative and strategic needs and the idiosyncrasies of individual rulers.

[337] *Discussant*

Inomata, Takeshi [81] see Ortiz, Jose Raul

Inskip, Sarah (University of Cambridge)

[31] *Being Male in al-Andalus: A Comparative Osteobiographical Approach to Reconstructing Islamic Identities in Medieval Spain*

In AD 711 the influx of Arabs and Berbers into Iberia culminated in the formation of the only Islamic state in medieval Western Europe. The uptake of new religious ideology and cultural practices by the inhabitants, which when applied in their unique sociohistorical context, resulted in an Iberian Islamic identity. While much research has explored variation in the lives of women, including debates on their freedom of movement and activity, less is

postulated about the lives of men and what it meant to be Muslim and male in al-Andalus. Fortunately, due to the reflective relationship that exists between the body and society, the analysis of human skeletal and funerary remains offers an opportunity to address this lacuna. An osteobiographical approach, which explores both cumulative and individual life histories, can inform about shifts in male practices and lifeways when data are compared between groups. Furthermore, as the practice of certain behaviors is key in identity (re)construction, interpretation of these changes in the relevant social, political and historical context informs about important factors affecting the lives of men in Iberia. This is demonstrated through an analysis of markers of activity, disease, stature and burial rites from Medieval Écija and Coracho, Spain.

Iott, Molly [155] see Reese, Kelsey

Iovita, Radu (New York University), Johannes Pflöging (ETH-Zürich) and Jonas Buchli (ETH-Zürich)

[40] *Evaluating the Effect of Force and Duration on Lithic Use Wear Using a Force- and Impedance-Controlled Robot*

Use-wear analysis relies on the strength of the analogy between microscopic wear patterns produced in laboratory experiments and those present on archaeological tools. Unfortunately, the physical processes that control the production of these patterns, both in the lab and in the past, are subject to complex interactions. One approach to reducing this complexity is to isolate factors (duration, material properties, or dynamics) that influence wear patterns and try to identify their contribution. An important issue concerns the possibility that wear on tools thought to have been used for a long time may in fact reflect use with a higher force, as both factors should, in theory, affect wear (e.g., Key et al. 2014, JAMT). We present results from experiments using a KUKA LWR-iiwa force- and impedance-controlled robot to scrape beech plates. The input data for controlling the robot (force, torque, velocity, position) were obtained from a dynamically monitored scraping experiment performed by humans (Pflöging et al. 2015, PLoS One). Because of the high level of control, we are able to systematically vary the duration and force and investigate their effect on the wear patterns, which are quantified via 3D surface metrological methods using a focus-variation instrument from Alicona.

[40] *Chair*

Iovita, Radu [169] see Smith, Geoff M.

Iriarte-Chiapusso, Maria José [165] see Bradtmöller, Marcel

Isaksson, Sven [35] see Junno, Aripekka

Iseminger, Bill (Cahokia Mounds)

[283] *Chair*

Isern, Neus [38] see Fort, Joaquim

Islas Orozco, Mirsa (Mirsa Islas Orozco)

[292] *Historical Archaeology in Downtown Mexico City: The Case of “La Casa del Mayorazgo de Nava Chávez”*

The historical center of Mexico City is a canvas of superimposed maps in which we can perceive history through the streets and architectural diversity. In this territory the Mexica Empire was settled as well as the colonial city. Later, this area was essential for the independence conflict and revolution. Nowadays is the political and cultural center of Mexico. The historic heart of the city has been the setting of outstanding incidental discoveries, of great significance for Mexican archaeology. The latest major finding was the monolith of the Earth Goddess, Tlaltecuhli, discovered on October 2, 2016, inside the Mayorazgo de Nava Chávez, premises popularly known as “La Casa de las Ajaracas.” Although this site was the scenario of an intensive religious and ritual activity during prehispanic times, it has been continuously occupied for five centuries, since the Conquest. The aim of this paper is to present the history of this place and their inhabitants, as well as the results of the analysis of colonial ceramic materials recovered during the excavations of the seventh field season of the Templo Mayor Project.

Issavi, Justine (Stanford University)

[73] *Trash Talk: (Re)evaluating External Spaces at Çatalhöyük, Turkey*

The Neolithic tell site of Çatalhöyük is composed of clusters of structures interspersed with open or external areas that contain extensive deposits of midden, as well as evidence for several other activities. James Mellaart (1967) initially identified these areas as courtyards while the current project has variously evaluated these spaces through frameworks of discard, food, and sharing practices. A general understanding of external spaces at Çatalhöyük sees them transformed from relatively informal and communal spaces into spaces that were used by individual houses or households as they became more autonomous and insulated, mirroring a wider social transformation noted elsewhere in the Near Eastern Neolithic. External spaces at Çatalhöyük, however, tend to be varied and complex and analyses often rely on comparisons between broad spatiotemporal categories. A multipronged approach including archaeological excavation, archival research, and spatial and statistical analyses has been deployed to provide a deeper understanding of these dynamic spaces and their long-term development. This paper will provide a brief synthesis of previous results, as well as present preliminary insights from recent research and the excavation of a large external space at Çatalhöyük in order to reevaluate external spaces as integrated parts of the Neolithic social and architectural landscape.

[73] *Chair*

Ito, Nobuyuki [236] see Fukaya, Misaki

Iverson, Shannon (Rice University)

[395] *Resignification as a Way In and a Way Out: Power and the Colonial Religious Experience in Tula, Hidalgo*

Archaeological assemblages from two early colonial religious sites at Tula, Hidalgo, are nearly indistinguishable from precolumbian assemblages at the same sites. These findings indicate that colonial changes in material culture were much more gradual than we expected, and driven to a surprising degree by Indigenous traditions and aesthetic prerogatives. These data led us to reconsider various models of social change that would adequately account for the observations of material culture at Spanish religious sites. Clearly, we know from documentary sources that the so-called colonial encounter was not an equal exchange of ideas. However, models of top-down power alone could not account for the data in Tula. Conversely, models

that posited cultural continuity—an Indigenous “core” with a Spanish colonial “veneer”—seemed inadequate to account for genuine Indigenous relationships with the Church. This paper explores the legacies and problems of several models, including acculturation and syncretism, before positing Judith Butler’s concept of resignification as an appropriate model of colonial power and religious change.

Ives, John W. (University of Alberta)

[339] *Seeking Congruency: Search Images, Archaeological Records, and Apachean Origins*

Apachean prehistory presents a significant conundrum: remarkably resilient and pragmatic people, Athapaskan speakers consistently adopted many elements of the ceremonial life and material culture of their neighbors, making for profound archaeological challenges. How do we truly know when an archaeological record was created by Proto-Apachean ancestors? The best response to this challenge is to draw upon the independent strengths of anthropological, linguistic and genetic studies to develop a series of “search images” pertinent to various stages of Apachean migration from Subarctic Canada to the American Southwest. These fields have provided clear targets we should anticipate in Apachean prehistory. The founding Apachean population was small, and undoubtedly grew through fissioning of small populations creating further founder effects. Yet, Proto-Apachean populations did not remain small: many people (especially women from neighboring societies) joined nascent Apache and Navajo groups. With new data emerging from Promontory Culture, Franktown Cave and Dismal River sites, specific search images can be evaluated against the rich perishable, demographic, and isotopic data as well as evidence of societal interactions now available, in the context of high-precision chronologies. This paper will offer a synthesis of the status of archaeological research into Apachean prehistory arising from the symposium contributions.

[226] *Discussant*

[339] *Chair*

Ives, John W. [339] see Billinger, Michael

Iwanami, Ren [330] see Hirasawa, Yu

Izeta, Andres (IDACOR-CONICET, Universidad Nacional de Córdoba, Argentina) and Roxana Cattáneo (IDACOR-CONICET, Universidad Nacional de Córdoba)

[227] *Networking: Digital Archaeology Repositories in Argentina*

The digitization of primary data in social sciences and humanities, including archaeology, has been a central issue in the management of science in Argentina by federal agencies, public universities and private foundations. About this topic, Argentina’s National Research Council (CONICET) created the Interactive Platform for Social Science Research, an interdisciplinary space, that over six years has generated protocols related to digitization and ways to share these results under the concept of open science. In this framework, a program focused on archaeology (Digital Archaeology Program—PAD) became an instance of theoretical reflexivity on the digital turn in the discipline and the social sciences and the humanities. Based on that experience we present some results from the PAD digital repository, which integrates archaeological collections, databases, gray literature, and publications. We will discuss relevant topics such as repository laws and digitalization criteria in Argentina, limitation of software and hardware, methodological issues and the training of human resources.

Jackley, Julia, Dana Lepofsky (Simon Fraser University), Nancy J. Turner (University of Victoria) and Jennifer Carpenter (Heiltsuk Integrated Resource Management Department)

[77] *Mountain Top to Ocean Floor: The Eco-Cultural History of Hauyat*

The Mountain Top to Ocean Floor Project is a collaborative undertaking by the Heiltsuk First Nation, Simon Fraser University, and the University of Victoria that seeks to document and explore the unique cultural and ecological history of Hauyat, a landscape in Heiltsuk traditional territory on the Central Coast of British Columbia. Over millennia, Hauyat has been transformed by a complex web of relationships among people, plants, animals and ecosystems. The rich and deep history of this place is known through Heiltsuk oral history and is also reflected in the number and diversity of archaeological sites and eco-cultural features. Ranging from the lower intertidal to the subalpine, the landscape has been modified to include clam gardens, fish traps, root gardens, berry patches, orchards, settlements, rock art, and defensive sites. These features are suggestive of long-term resource management systems that likely worked together to provide food, materials, and medicines for past communities.

Jackson, Gary [28] see Smith, Claire

Jackson, Sarah (University of Cincinnati), Linda A. Brown (George Washington University) and Brett A. Houk (Texas Tech University)

[83] *The Emic, the Etic, and the Electronic: Digital Documentation in Northwestern Belize*

Twenty-five years of archaeological research in northwestern Belize have yielded a robust regional database, allowing a rich and diverse picture of ancient Maya life to emerge. As part of this research, multiple projects have recently adopted innovative digital technologies using new methods to record and envision ancient sites in novel ways. This paper presents some of the ways in which researchers have engaged with digital technologies that allow for the collection of new types of data, as well as renewed engagement with traditional archaeological data, with the overall goal of highlighting the array of methods used in this region and how they might be translatable to other Maya sites. In particular, our paper focuses on digital approaches used by the Say Kah and Chan Chich Archaeological Projects. Both projects use tablet-based paperless recording systems to streamline data collection. At Say Kah, the relational database is unique as it provides interpretive transformations by recording artifacts and features according to two cultural perspectives: archaeological and Classic Maya. The project at Chan Chich employs drones to map vast cleared areas and includes Structure from Motion documentation of excavations as a standard recording practice.

Jacobi, Keith [185] see Dye, David

Jaffe, Yitzchak (New York University ISAW)

[36] *Between Control and Influence: Early Globalization Processes in Bronze Age China*

The traditional narrative of the Zhou expansion (1046–771 BCE, roughly 800 before the formation of the first Chinese empire in 221 BCE), has been to view it as a military enlargement and conquest and as leading, consequently, to the establishment of a polity controlling a large territorial state. To date, most studies have viewed the finding of Zhou artifacts in a given region as indicating Zhou political control over that area or even that actual Zhou people inhabited the region. This paper argues that the Zhou expansion must be investigated in a contextual manner to evaluate the regional-specific cases of cultural exchange and the process through which it created new forms of localized social identities. Globalization offers a model that focuses less on an

all-powerful center dominating a periphery. Instead, it is the natural process by which the creation of new forms of connectivity, entanglements and cultural practices emerge from supra local interaction. This approach not only gets away from problematic models that identify material culture with specific ethnic groups, but also renounces power dynamics that conflate control with material assemblages.

Jafri, Nazim (Aligarh Muslim University, Aligarh India)

[167] *Cultural Change in Funerary Practices from Harappan to Post-Harappan Phases in Protohistoric India*

Various archaeological sites in the Indian subcontinent namely, Harappa, Kalibangan, Surkotada, Lothal, Daimabad, Bhagwanpura, Navadatoli and Nevasa have been identified as settlements dated to roughly 3000 to 1000 BC. These archaeological sites present evidences of urn burials, which have generally been overlooked in favor of extended burials and cremations, not unlike contemporary funerary practices. In this paper, I examine the distribution pattern of burials and cremations at the above sites, to shed light on cultural changes with respect to funerary practices in protohistoric India. The results suggest a dramatic cultural change in the practice of burials from the north Indian sites to the cremations on the sites in central and Eastern India. This suggests the Harappan Civilization was confined to the northern Indian continent, and its extension toward central and southern India was Post-Harappan expansion with remarkable cultural or religious change.

Jaimes Vences, Gustavo (Doctorado en Estudios Mesoamericanos. Universidad Nacional Autónoma de México)

[145] *Caracterización química (MEB-EDS) y cristalográfica (DRX) de cerámica local del sitio arqueológico Santa Cruz Atizapán*

En el sitio arqueológico de Santa Cruz Atizapán (con ocupación desde el Clásico tardío ca. 500–650 dc hasta el Epiclásico ca. 650–900 dc), han sido detectadas macroscópicamente una serie de pastas, que por sus atributos de textura, compacidad e inclusiones, fueron agrupadas en nueve conjuntos (Inclusiones café, blancas, naranjas, de varios colores, pseudo anaranjado delgado, fina, intermedia, burda y con mica). Lo anterior refleja una diversidad en los posibles centros de producción cerámica que abastecían de vasijas a Santa Cruz Atizapán durante la época prehispánica. Con el objetivo de corroborar dicho planteamiento, se obtuvo la composición química de esos conjuntos mediante Microscopía Electrónica de Barrido con Espectroscopía por Dispersión de Energía (MEB-EDS), además se adquirieron diversas imágenes de la estructura microscópica de la pasta. Así mismo, para complementar la caracterización, se empleó la Difracción de Rayos X (DRX), lo cual permitió identificar las fases cristalinas de las arcillas usadas para la elaboración del utilaje cerámico. Los resultados preliminares permitieron la identificación de diatomeas en arcillas pertenecientes, en su mayoría, al Epiclásico, así como en aquellos correspondientes al Pseudo Anaranjado Delgado. Por su parte, las predominantes del Clásico (inclusiones café, naranjas, de varios colores) no las presentan.

[145] *Chair*

Jakob, Tina, Joe W. Walser III (University of Iceland and the National Museum), Donatella Usai (Centro Studi Sudanesi e Sub-Sahariani, Trevio, Ita) and Sandro Salvatori (Centro Studi Sudanesi e Sub-Sahariani, Trevio, Ita)

[219] *A View from the Periphery: Bioarchaeology and Funerary Archaeology at Al Khiday, Central Sudan*

Archaeological sites south of Khartoum are much scarcer compared to those further to the north and this presentation aims to report on a multi-phase cemetery that is situated at the periphery of our archaeological knowledge. At present, burials dating to three chronological periods have been recovered at Al Khiday. The site is located on the left bank of the White Nile, approximately 20 km south of Omdurman (Khartoum). Forty-two individuals are dated to the Classic/Late Meroitic period (end of the first millennium BCE/beginning of the first millennium CE), while 25 early Neolithic burials date to the mid-fifth millennium BCE. Bioarchaeological parameters (age and sex distribution) are analyzed in conjunction with funerary rites (body placement, orientation and grave goods) and compared to Neolithic and Meroitic cemeteries in Nubia to evaluate whether the Al Khiday populations adhered to the same burial customs as those further north. Furthermore, the oldest burials, dated to the pre-Mesolithic period (>12.700–11.100 BCE), by using a combination of stratigraphic observations, mineral deposition and stable isotope analyses are the most exceptional. Most of the 94 individuals are buried in an extended, prone position, attesting to a unique funerary rite that is unparalleled on such a large scale.

Jalbert, Catherine (Memorial University of Newfoundland/Moore Archeological Consulting, Inc.)

[258] *Archaeology and the Social Sciences and Humanities Research Council (SSHRC): A Gendered Analysis of Federal Funding in Canada, Fiscal Years 1994–2014*

Research conducted over the past twenty years on gender politics in archaeology have addressed both how the past is investigated, and has examined the presence of equity issues in the archaeological workplace. It has been suggested that multiple barriers exist for women's advancement, however, funding for archaeological research has received little attention in the literature. Although studies in the United States and Australia have highlighted the presence of funding disparities between women and men, the situation in Canada is less understood. Specifically, I will present analyzed data from SSHRC's Standard Research Grant and Insight Grant programs to examine if similar disparities are seen in Canada. Results from SSHRC show that although women and men had similar success rates, submissions from women were less than half that of men, and women listed as principal investigator received less funding on average. These results will then be compared to extant data from the United States and Australia. Providing contextualization in this way will aid in determining if global trends in gender disparities in archaeological funding are present and why they might be occurring.

Jamaldin, Sophia [140] see Reaux, Derek

James, Emma [191] see Hawkins, Hannah

James, Nathaniel (Washington State University)

[177] *Revisiting Harappa: A Reevaluation of Macrobotanical Evidence*

Harappa is a key site in understanding of the plant-human relationships that defined the increasing urbanization and eventual regionalization of the Indus Valley from 3300–1700 cal. BC. This paper presents a reevaluation of macrobotanical evidence excavated at Harappa from 1990–2000. It charts how the archaeobotanical record reflects changing social organization at the site.

Jamieson, Elaine (University of Reading)

[168] *Wizards, Dragons, and Giants: Creating Motte Castles in an English Landscape*

Medieval motte castles are large flat-topped earth and stone mounds, often coupled with an enclosure or bailey, and represent a characteristic component of the British landscape. Mottes often dominate their immediate surroundings, with many remaining visually impressive monuments to this day. Although their creation often involved substantial landscape change, it is becoming increasingly clear that continuity could also be maintained. Many mottes were placed at points in the landscape with preexisting ritual significance, as seen through the adaptation of extant Saxon town defenses,

the reuse of Iron-Age hillforts, and the reappropriation of prehistoric mounds. The transformation of such sites would have reshaped peoples' perception of place, serving not only to create continuities with the past, but also to facilitate a reordering of the broader social and symbolic world. A ritual dimension may also have been ascribed to the creation of the motte castle, with levels of significance attached to the processes surrounding its construction. This paper will draw on results from the Leverhulme Trust funded project *Extending Histories: From Medieval Mottes to Prehistoric Round Mounds*, which is investigating the archaeology and history of monumental mounds in the English landscape.

Jamieson, Ross W.

[270] *Tokens of Oppression: Coinage at a Nineteenth-Century Galapagos Sugar Plantation*

In the 1870s Manuel J. Cobos founded the El Progreso plantation agricultural operation on the Island of San Cristóbal in the Galapagos. It is known that he used "scrip," or company-issued cash, to force workers to only spend their wages at the company store. Archaeological recovery of hard rubber tokens from several plantation contexts brings up many questions of economics and labor relations surrounding this remote location that was also tied to the global economy through steam power, commodity agriculture, and ideas of modernity.

[270] *Chair*

Jamieson, Ross W. [270] see Astudillo, Fernando J.

Jamsranjav, Baiyarsaikhan [114] see Barton, Loukas

Janetski, Joel (Brigham Young University)

[339] *The Promontory Phase in the Eastern Great Basin*

Julian Steward found a distinctive culture in the uppermost levels of several caves on the north shore of the Great Salt Lake and labeled it Promontory after the low range of mountains containing the caves. Based on stratigraphy, material diagnostics and findings elsewhere along the Wasatch Front, he placed the Promontory culture subsequent to the Puebloan (Fremont) and prior to the Shoshone presence. Steward recognized the possibility that these recent cave occupants were Athapaskan speakers related to Canadian peoples to the north, a suggestion reinforced by recent research. Initial radiocarbon dating of Promontory moccasins suggested the Promontory culture was contemporary with late Fremont, and recent dating of perishables from the cave have reinforced that temporal placement. Non-perishable Promontory culture diagnostics include Desert Side-notched arrow points and low-fired, calcite tempered ceramics, objects also found in abundance at open sites along the Wasatch Front. All sites with these signature artifacts, including the caves, are referred to as representing the Promontory Phase in the eastern Great Basin; however, Promontory open sites postdate the bulk of cave Promontory dates on average by 200 years or more. This paper explores why open site dates were occupied later than those from the caves.

Jansen, Amelia (University of Tennessee, Knoxville/ SEAC), Martin Walker (University of Tennessee, Knoxville), Heather Woods (University of Tennessee, Knoxville), Alexander Craib (University of Wyoming) and Anita Lehew (University of South Carolina)

[92] *Woodland Period Occupations along the Savannah River: An Update of the Late Prehistoric Investigations at the Topper Site (38AL23), Allendale, South Carolina*

The Topper Site (38AL23) is a multicomponent prehistoric site located along the eastern bank of the Savannah River in South Carolina. The focus of ongoing University of Tennessee, Knoxville excavations at the Topper Site are the extensive Woodland and Mississippian occupations that have until recently gone unexamined. To date, two block excavations and a dispersed 1 × 1 m unit survey have been completed to better define these later occupations. Excavations have also resulted in the mapping, excavation, and processing of 357 features representing possible pits, post-holes, and other signs of past human activity. Utilizing the open-source software QGIS, site-level distributional analyses of recovered materials and features, and regional-level comparisons have shed new light on the peoples inhabiting and utilizing the Savannah River and surrounding areas. This paper presents a synthesis of these analyses as well as highlights the unique artifacts and features that have been excavated and will discuss the future directions of the project.

Janssens, Rindert [356] see Bogemans, Frieda

Jansson, Anna (University of Arizona)

[344] *Before and After Mazama at the Billy Big Spring Site: Landscape Evolution during Altithermal Times and Reoccupation after the Eruption*

How did the ash fall from the Mount Mazama eruption (7682–7584 cal. yr BP [Egan et al. 2015]) affect the people on the Northwestern Plains who experienced it? Data from 24GL304 (the Billy Big Spring Site) in north-central Montana is used to investigate this question. Excavations conducted in 1952, 1954, 1971 by Thomas Kehoe and in 2016 by our team all found extensive Middle and Late Plains Archaic deposits, but in 2016 we discovered a ~10 cm thick layer of ash from this eruption. This poster addresses four research questions through the lens of geomorphology and soil science: (1) How did the landscape evolve before and after the Mazama ash fall? (2) How did the paleoenvironment evolve after the eruption? (3) How does this landscape setting correspond to what archaeologists know about the Altithermal (9400–6000 cal. yr BP [Barnosky 1989]) on the Northwestern Plains? (4) How long did it take for people to reoccupy this site after it was covered with Mazama ash, and what did this occupation look like? Archaeologists have long hypothesized about the impacts of the Altithermal on the Northwestern Plains, and I hope to contribute to this discussion with data from these recent excavations.

Jansson, Anna [344] see Thompson, Ashleigh

Janusek, John [230] see Bowen, Corey

Janz, Lisa (Trent University)

[99] *Expanding Frontier and Building the Sphere in the Western Deserts*

During the early and middle Holocene the deserts of Mongolia and northern China were characterized by arid grasslands and numerous lakes and wetlands. Specialized wetland exploitation defined land use during this period, but more detailed data on subsistence is not clear. The prevalent use of microlithic technology and the lack of architectural structures underscores the presumption that these groups were highly mobile hunter-gatherers, but increasing evidence reveals that pastoralism spread widely across the steppes of Northeast Asia during the third millennium BC. There has been no clear discussion of how desert groups were impacted by these changes. Here I examined the extent of climatic amelioration and present evidence to

suggest that inhabitants of the western deserts were numerous and influential, and that they played a substantial role in the spread of pastoralist technologies—such as herding and bronze—into and across China.

Janzen, Anneke (Cotsen Institute of Archaeology, UCLA), Patrick Roberts (Max Planck Institute for the Science of Human Hist) and Nicole Boivin (Max Planck Institute for the Science of Human Hist)

[284] *Using Stable Isotopes to Explore Ancient Wildebeest Mobility in the Context of Pastoral Expansion*

The spread of pastoralism through Kenya may have been slowed by novel disease challenges presented to livestock by wild taxa. In particular, wildebeest-derived malignant catarrhal fever (WD-MCF), which is extremely fatal to cattle, would have been encountered by pastoralists for the first time as they moved south of the Lake Turkana Basin into the native range of East African wildebeest (*Connochaetes taurinus*). Today, migratory wildebeest have well-known annual migration patterns. However, while they are currently not found north of Kenya's Loita or Athi-Kapiti Plains, nor did early explorers describe them there, archaeological sites document their presence as far north as Lake Baringo until the second millennium BP. Pastoral extirpation of wildebeest populations from the prime grazing areas of the Central Rift Valley is one likely cause of their shifting biogeography over time. Stable isotope analysis is a powerful tool to examine ancient patterns of wildebeest distribution and mobility in the context of pastoral expansion. Through sequential sampling of wildebeest molars from Rift Valley archaeological sites spanning the mid to late Holocene for carbon, oxygen, and strontium isotope analysis, a history of their annual migration cycles as herders and their livestock spread throughout their native range may be documented.

Jaramillo, Luis (Profesor Asociado Departamento de Antropología)

[106] *Los Muisca de la Sabana de Bogotá: Muchos cacicazgos? Patrones de asentamiento, demografía y organización política en la parte baja de la cuenca del río Teusacá.*

Investigaciones recientes en la cuenca baja del río Teusacá -la zona del valle de Sopó-, han proporcionado información regional que permite revisar con nuevos datos, el tema siempre interesante de cuál era el grado de complejidad de los muisca -y cuál su patrón general de asentamiento-, al ser ésta considerada como una—sino la más compleja— de las sociedades encontradas por los españoles alrededor de 1540 en el actual territorio de Colombia. A pesar de que ésta perspectiva ha sido respaldada y defendida por diversos estudiosos, este punto de vista deriva y se soporta casi que enteramente en las fuentes etnohistóricas y documentos coloniales tempranos. Pero en el valle de Sopó, sin embargo, ha sido posible conjugar y cotejar información arqueológica sobre los asentamientos en una escala regional con datos etnohistóricos sobre demografía y organización política, lo que permite argumentar que aunque siendo complejo el escenario, la estructura básica organizacional correspondía a pequeñas comunidades con altos grados de independencia, siendo este un escenario que contrasta con la idea de un control central y de gran alcance por parte de unos pocos centros de poder, como Bacatá en el extremo sur de la sabana.

Jarquín, Ana M. (Ana M. Jarquín Pacheco) and Enrique Martínez (Enrique Martínez Vargas)

[217] *El Palacio Norte de la Ciudadela, Conjunto 1D, Teotihuacán*

Los trabajos de investigación arqueológica en el Palacio Norte de La Ciudadela de Teotihuacán permitieron establecer que dicho recinto fue construido en relación a la consolidación del poder estatal y su autoridad además de su legitimación. Lo anterior en la búsqueda del reconocimiento de la población hacía los funcionarios que representaban un sistema económico, político, y religioso, como un todo, basado en instituciones estructuradas de manera tal que, regían todos los aspectos de la vida de los habitantes de la antigua urbe. La ciudadela durante un lapso considerable de tiempo fue sede del sistema político, económico, y religioso de Teotihuacán. Bajo los escombros del último momento ocupacional del recinto, asociado al momento del llamado colapso Teotihuacano, se localizaron evidencias que llevaron a proponer la planeación del lugar en base a principios de carácter político, mítico-religioso y astronómicos. El análisis de los vestigios materiales, permitió sustentar la hipótesis de un conjunto arquitectónico, que posteriormente constituiría el modelo de los recintos ceremoniales importantes en varios asentamientos destacados, lugar de habitación de personajes importantes, posiblemente parte del sistema político que regía la estructura política, económica, y religiosa oficial Teotihuacana.

Jarriel, Katherine (Cornell University)

[132] *Modeling Maritime Travel in the Bronze Age Cyclades (Greece)*

In this paper, I model maritime connections in the central Cyclades (Greece) to better understand small world network interactions during the Early Bronze Age (ca. 3100–2000 BCE). Using Geographic Information Systems (GIS), I create a cost raster of local and seasonal wind and wave patterns in the Aegean. Based on this, I generate an anisotropic model of the time it takes to sail outward from various settlements. When compared with ethnographic and archaeological evidence about travel times for habitual interaction, I predict which Early Cycladic communities would have interacted with one another on a regular basis. This allows for a more complete understanding of the intensity and frequency of Early Cycladic intercommunity relations. By relying on travel times rather than absolute distance, this model offers an understanding of community interactions based on meaningful scales of human movement and social time.

Jastremski, Nicole [232] see Van Voorhis, Laura

Jay, Bethany [122] see Randall, Lindsay

Jazwa, Christopher (Pennsylvania State University), Douglas J. Kennett (Pennsylvania State University) and Bruce Winterhalder (University of California, Davis)

[383] *Territoriality among Coastal Villages on California's Northern Channel Islands*

The location of archaeological settlement sites is influenced not only by the distribution of ecological resources, but also cultural factors including conflict between neighboring populations. The ideal free distribution is a human behavioral ecology model that has been used to understand the establishment and persistence of settlement sites in the archaeological record. On California's northern Channel Islands, the number and location of settlement sites expands over time until the Medieval Climatic Anomaly (1150–600 cal BP), consistent with the predictions of the ideal free distribution. Afterward, total population on the islands continued to increase, but the number of major settlement sites decreased. We argue that this pattern, which is consistent with the ideal despotic distribution model variant, is related in part to territoriality and conflict. Rather than focusing settlement on all the best ecological locations, there are buffer zones between villages that were unoccupied. This includes the depopulation of sites that were occupied early and persistently throughout the Holocene. Many of the occupied sites are in defensible locations with large viewsheds. This study provides a useful case study for understanding the relationship between ecological and social factors in settlement distributions, illustrating the explanatory value of balancing general models and specific cases.

Jefferies, Richard (Dick Jefferies)**[61]** *Discussant*

Jefferies, Richard [87] see Stumpf, Tyler

Jelinek, Lauren (Bureau of Reclamation)**[255]** *Moderator***Jenkins, Chris and Lance Lundquist****[351]** *Beyond "Document and Destroy" Mitigation: Fill In the Blank*

The National Historic Preservation Act requires federal agencies to consider the effects of their actions on historic properties. In contrast to many other federal agencies, the Army Corps of Engineers, Regulatory Branch does not initiate undertakings on its own behalf. Rather, it is tasked with verifying permit applications from other agencies and the public. The Regulatory Branch is neither a proponent nor opponent of the permitted action. As a neutral party, one of the more challenging aspects of the Section 106 process is developing meaningful mitigation to resolve adverse. However before the consultation process reaches this point, the efforts to avoid and minimize the effects on historic properties plays an important role, contributing to and limiting the options to resolve the adverse effects. Examining permitting actions by the Seattle District Regulatory Branch, this paper presents efforts taken to avoid and minimize adverse effects and how these influenced the efforts to find and craft mitigation to resolve the adverse effects. A major challenge is balancing the conflicting agendas and requests of the consulting parties. The process to consider the consulting party's opinions and the efforts to identify and develop the mitigation measures and their efficacy is presented.

Jenkins, Chris [351] see Lundquist, Lance

Jenkins, Dennis (Museum of Nat. & Cult. Hist., University of Oregon)**[226]** *Western Stemmed Occupations of the Northern Great Basin*

Recent research into the chronology and character of Western Stemmed Tradition occupations at the Paisley and Connley Caves provides new insight into the settlement-subsistence patterns and social organization of the period >13,000 to 9000 cal. BP. Human populations may have been larger, more social, and territorially constrained than previously envisioned. Long distance movement of obsidian artifacts across the landscape probably reflect brief population agglomerations (festivals) scheduled to coincide seasonally with peak periods of biologic productivity (late summer–early fall). Pronghorn and rabbit drives, in particular, in and around grasslands surrounding lowland lakes and marshes offered the perfect opportunity to meet potential mates, trade, gamble, exchange gossip, and keep abreast of social developments.

Jenkins, Emma (Bournemouth University), Sarah Elliott (Council for British Research in the Levant), Samantha Allcock (University of Plymouth), Carol Palmer (Council for British Research in the Levant) and John Grattan (Aberystwyth University)**[274]** *Using Geochemistry, Phytoliths, and Ethnographic Analogy to Interpret Neolithic Settlements in Southwest Asia*

Our understanding of Neolithic sites in southwest Asia is often impeded by the lack of preservation of biological evidence. As a result, they often consist of a series of structures, the construction and function of which, remains elusive. In order to address this problem we conducted a study which used phytoliths and geochemistry from an ethnographic site in Jordan, Al Ma'tan, to determine if certain building construction techniques and anthropogenic activities leave specific phytolith and elemental signatures. We sampled a range of context categories and our results found that certain categories, for example fire installations and animal penning areas, do have distinct phytolith and elemental concentrations. Other categories, however, were less distinguishable; mainly those constructed using the same local clay sources, for example the makeup of hearths, plastered features, and wall plasters.

Jenks, Kelly (New Mexico State University)**[375]** *Prehistoric Rock Art and Historic "Graffiti": Petroglyphs at a Multicomponent Site in Eastern New Mexico*

Recent field investigations at Los Ojitos, a multicomponent site in the Middle Pecos River Valley, have focused on refining the site chronology and documenting the land-use practices of Hispanic homesteaders who settled this area in the late nineteenth century. Like earlier visitors to this site, the Hispanic settlers were attracted to the clean water provided by several little springs ("ojitos") that empty into the river. Survey of one of these spring-fed drainages identified at least 45 petroglyphs—many concentrated in a shady alcove—that range from prehistoric horned serpent figures and undated abstract designs to historical-period carvings of names, anthropomorphs, and possible gaming boards. This paper presents the results of this survey and reflects on the different ways archaeologists have approached and investigated prehistoric and historical-period rock art in this area.

[255] *Discussant***Jennings, Justin (Royal Ontario Museum)****[147]** *Discussant*

Jennings, Richard [32] see Petchey, Fiona

Jensen, Anne (Bryn Mawr College)**[2]** *Walakpa as Case Study: Rescuing Heritage and Data from a Vanishing Site*

Walakpa is an iconic Arctic site with spectacular preservation, due to frozen conditions. Although many believe it to have been fully excavated, Stanford was only able to reach a third of the way to sterile soil due to permafrost, so earlier occupations of the site remain unstudied. Long considered stable, Walakpa began eroding rapidly in 2013. A single recent storm removed over 30 m of cultural stratigraphy along a 100+ m front. Need for rapid response prompted a large volunteer effort in 2016, with support from the landowner (an Alaska Native village corporation) and the municipality, as well as many individuals. I will briefly describe the data recovered. Walakpa is only one of many such significant sites in the north, all under threat from climate change. Using Walakpa as an example, I will discuss the implications for our ability to contribute to the expansion of scientific knowledge of the past, and discuss how choices we make in the next few years will impact our science for the foreseeable future.

[224] *Discussant***[144]** *Chair*

Jensen, Anne [144] see Sayle, Kerry

Jensen, Craig (Aquinas College) and Mark Golitko (University of Notre Dame)

[196] *Ceramics Provenience: Chemical Analysis of Ceramics and Clays in Eastern Hungary via LA-ICP-MS*

This project explores the provenience of ceramics found at the Bronze Age Békés 103 cemetery. By answering the question of where these ceramics came from, it is possible to hypothesize which Bronze Age communities used the cemetery. To do this, clays were collected throughout Eastern Hungary for chemical analysis. Clay is often found along river banks, but many modern rivers may have been polluted. Instead, paleo-meanders of modern rivers were chosen as collection sites; these were identified using QGIS. This revealed the chemical variability found throughout the region. Then, by comparing the chemical composition of the clays to that of the Békés 103 ceramics, the farthest possible extent of cemetery usage was determined. Preliminary analysis of the clays was performed using XRF. Both the ceramics and the clays were analyzed by LA-ICP-MS.

Jensen, Jill (National Trails Intermountain Region–NPS)

[255] *Discussant*

Jeremiah, Kristen (Public Archaeology Laboratory, Inc. [PAL])

[16] *Campfire Stories: Defining Features at the Susquetonscut Brook Site 11 in Eastern Connecticut*

The Susquetonscut Brook Site 11 (SB-11) is a Native American campsite occupied primarily during the Archaic Period and again briefly in the Woodland Period. Data recovery excavations conducted by The Public Archaeology Laboratory, Inc. (PAL) in the summer of 2015 resulted in the recovery of thousands of artifacts and the exposure of 14 cultural features, including post-molds, pit features, fire hearths, and a roasting platform. Feature definition was attained through a variety of analyses, including behavioral studies in regard to resource processing, as evidenced by stone tool morphology and use-wear patterns; lithic tool manufacturing and maintenance, as evidenced by lithic debitage characteristics; refuse patterning, as evidenced by spatial relationships between thermally altered rocks, charcoal, lithic artifacts, and faunal remains; and specialized studies consisting of protein residue, 14C, and phytolith analyses. The results of archaeological investigations provided a better understanding of Native American Archaic period habitation in the Yantic River Drainage basin of eastern Connecticut.

Jerrems, William

[375] *Petroglyphs As Time Markers for Pleistocene Occupation of the Great Basin*

The association of cupules and pit and groove petroglyphs is possibly the oldest form of "rock art" in the Americas as evidenced in the northern Great Basin. Recant methods of dating petroglyphs, made possible by unusual paleoclimatic circumstances, have resulted in what may be the identification of the "North America's oldest petroglyphs." Three sites located on the shores of ancient Pleistocene Lakes, two at Lake Lahontan in northern Nevada and one at Long Lake in southern Oregon, have given evidence of this style of petroglyph's great antiquity. At Winnemucca Lake in the far northwestern sub-basin of the Lake Lahontan system, absolute dating was possible on a tufa dome of calcium carbonate deposited by variable lake levels of the Younger Dryas. In all three cases the pit and groove/cupule petroglyph style is present on the shores of Pleistocene pluvial lakes that are now dry lakebeds.

Jeske, Robert (University of Wisconsin Milwaukee)

[102] *Strangers in a Strange Land: The Lake Koshkonong Oneota Locality in Context*

The distribution of Oneota sites in Wisconsin has long been recognized as clustered within distinct areas referred to as Localities. At least seven localities are now generally accepted by Oneota researchers in Wisconsin; several others appear to exist in northern Illinois. However, recent research at the Lake Koshkonong locality shows that it stands as a distinctive outlier among all of the other localities. It is unique in terms of landscape patterns, subsistence strategies, distance from other localities, and interregional and/or interlocality economic and political relationships. A demonstration of this distinctiveness, and an explanation for it, are offered.

[102] *Chair*

Jew, Nicholas P. (University of Oregon), Taylor Dodrill (University of Oregon) and Scott M. Fitzpatrick (University of Oregon)

[223] *Stable Oxygen Isotope $\delta^{18}\text{O}$ Analysis of Crocus Clam (*Tridacna crocea*) from Palau, Micronesia: Evaluating a Proxy for Sea-Surface Temperature Reconstruction*

For thousands of years and on a global scale, shellfish have been a key resource for peoples living in island and coastal environments. Not only were they critical food resources, but can act as records of paleoenvironmental conditions. In this study, we evaluated whether the crocus clam (*Tridacna crocea*) could satisfactorily record ambient water temperature via the incorporation of oxygen isotope ratios into the calcium carbonate matrix during shell growth. Modern *Tridacna crocea* were collected from intertidal zones near the prehistoric (ca. 3000–0 BP) site of Chelechol ra Orrak in the northern Rock Islands of Palau and compared with samples from the archaeological assemblage. The shells were sampled for stable oxygen isotope analysis, fractionation equations applied, and temperatures compared to modern reported nearshore temperatures to determine the efficacy of *T. crocea*'s temperature recording. X-ray diffraction was also used to determine the shell's biomineralogical composition, necessary for selecting the appropriate water temperature conversion equation. Results demonstrate that this species is an accurate proxy for estimating ambient sea-surface temperatures (SST), particularly long-term changes due to its slower growth rate.

Jew, Nicholas P. [46] see Dodrill, Taylor

Ji, Ping [116] see Chen, Quanjia

Jiang, Shangwu [115] see Zhao, Yongsheng

Jiao, Tianlong [229] see Bestel, Sheahan

Jigen, Tang [117] see Xiaohong, Ye

Jiménez Álvarez, Socorro [5] see Fernandez Souza, Lilia

Jimenez Cano, Nayeli [44] see Bryant, Jeff

Jin, Guiyun, XianJun Fan (Hunan Provincial Institute of Cultural Relics and) and GuoKe Chen (Gansu Provincial Institute of Cultural Relics and)

[26] *Agriculture Development in the Bronze Age Hexi Corridor-Archaeobotanic Evidence from Xichengyi Site*

The combination of crops and weeds found in the site reflects a typical rainfed agriculture dominated by foxtail millet and broomcorn millet. Under the external cultural influences, wheat and barley started to be cultivated. Since late Machang culture and, through the agricultural development during the "Transitional type" period, were widely cultivated during the period of Siba culture, when marijuana appeared in the crop assemblages. The integrated study of archaeobotanical and zooarchaeological remains, and isotope analysis indicate a subsistence strategy dominated by dry farming during Siba culture in Xichengyi site. Meanwhile, husbandry accounted for certain percentage, with occasional hunting and gathering.

Jin, Heling [33] see Miao, Yunfa

Jin, Yingxi (Institute of Archaeology, Chinese Academy of Social Sciences)

[24] *Research on Neolithic Settlements in the Guanglu Island and the Liaodong Peninsula, China*

The Liaodong Peninsula was a hub that documented interactions across distinctive Neolithic cultures in northeastern China and the northern Korean Peninsula. The Neolithic sites in Liaodong were neighbors with the Liao River (Liaohe) culture to its north; located across the Yellow Sea from the Huanghe culture; and were adjacent to the Chulmun Neolithic culture in Korea across the Yalu River. Thus Liaodong is a key region to understanding cultural interactions throughout the Neolithic period in Northeast Asia. The Institute of Archaeology of the Chinese Academy of Social Sciences has conducted fieldworks in several Neolithic shell midden sites in the Guanglu Island in Liaodong for the last decade. This study focuses on changes in settlement patterns in the Guanglu Island and coastal sites in Liaodong.

Jing, Zhichun [72] see Chen, Hui

Jirsa, Courtney (George Washington University), Tamara Dogandžic (Department of Human Evolution, Max Planck Institut), Kathryn L. Ranhorn (George Washington University) and David R. Braun (George Washington University)

[153] *Assessing Edge Damage in MSA Lithic Assemblages: Experimental Proxies for the Analysis of Use and Postdepositional Damage*

Given the low frequency of retouched stone tools in many Middle Stone Age (MSA) assemblages, the analysis of edge damage on unretouched artifacts offers a promising depth of insight into tool-use behavior. Taphonomic process such as trampling, however, can also cause edge damage on lithic artifacts. As part of the investigation of Gajj17, an MSA site in the Koobi Fora region (Kenya), we conducted an experiment designed to investigate differences between edge damage resulting from use and that resulting from postdepositional damage. Damage was inflicted on the edges of a series of ignimbrite flakes in a variety of experimental contexts (e.g., butchery, trampling). These experiments mimicked processes that may inflict damage on tool edges. We assessed the relationship between edge angle and the intensity and continuity of edge damage in these experimentally damaged artifacts. A qualitative assessment of the intensity and continuity of edge damage was used to distinguish use from postdepositional damage. These criteria were applied to in situ and surface collections from Gajj17. These analyses sought to test whether the archaeological assemblages exhibit patterns of damage more similar to experimental use or trampling. This research was sponsored by the National Science Foundation IRES Program (OISE-1358178 and 1358200).

Jochim, Michael (Univ of California–Santa Barbara)

[332] *Functional and Organizational Variation among Late Mesolithic Sites in Southwestern Germany*

Because sites of the Late Mesolithic are relatively rare in southern Germany, and are mostly represented by caves, three open-air sites of this period provide unique insights into this period. Two of the sites are located on a lakeshore and the third is in a river valley. All three possess excellent preservation of organic materials that facilitate analysis. The contents and spatial organization of these sites will be examined in the context of their functional role and their implications for understanding the lifeways of the last hunter-gathers in the region.

Jochim, Michael [90] see Harris, Susan

Johal, Mannat (University of Chicago)

[167] *"The South" as Object of Knowledge between Archaeology and History*

With a focus on writing about the medieval period in southern India, this paper will interrogate how south India came to be defined as an object of knowledge, and thus, a space for representation. Narratives on the south Indian past, from the writing of the Dravidian proof in early nineteenth-century Madras to Nilakanta Sastri's iconic History of South India in the year of India's independence, have engendered polyvalent inheritances for current historiographical projects. In unpacking these inheritances, this paper is interested in the mechanics of the constitution of historical facts. While the history of medieval south India has typically drawn from textual sources, both literary and epigraphical, archaeology makes different promises of retrieval and representation. Yet, archaeologists too must contend with inheritances of method and narrative, often rooted in the particularities of the object of knowledge. Taking a cue from the attentiveness of deconstruction toward the processes of historiography, archivisation and the representation of knowledge, this paper interrogates the relationship between evidence and narrative. It is especially interested in the impetus for new evidence, and the role of newly generated facts in plugging perceived gaps in our knowledge of "the south."

Johal, Mannat [325] see Lycett, Mark

Johansen, Peter (McGill University) and Andrew Bauer (Stanford University)

[167] *Settlement, Socio-environmental Practice and the Long Durée of Landscape Production in South India: A Regional View from Maski, Raichur District, Karnataka*

For five seasons, the Maski Archaeological Research Project has been collecting new multi-period archaeological and environmental data on changing patterns in settlement, agricultural, pastoral and metallurgical land-use practices from a 64km² study area surrounding the large multi-period site at Maski. Our research documents significant temporal changes in the size, configuration, density and location of settlements, as well as those among a myriad of other sites (e.g., pastoral camps, field stations, iron working facilities, rock art complexes, water retention features, and mortuary sites), and 'off-site' artifact distributions dating to between the South Indian Neolithic and Medieval Periods (3000 BCE–1600 CE). Occupational histories of geo-environmental contexts (e.g., inselberg slopes and terraces, pediment slopes, peneplain and river terraces) point to shifts in social and environmental practices that transformed a range of soils, water and mineral sources into social and economic resources. We discuss how, through the deployment of strategies and technologies of control (social and environmental), opportunities and inequalities of access to these resources were constructed and contested across an ever-changing political landscape. In doing so we argue for a regionally unique social and environmental history in which ecological vectors of social difference contributed to the production of a temporally dynamic political landscape.

Johansson, Lindsay (University of Colorado, Boulder)

[339] *People and Animals on the Move: Insights from the Promontory Caves on Proto-Apachean Faunal Use and Hunting Practices*

The faunal assemblages recovered from the Promontory Caves by Julian Steward, and more recently by John Ives and Joel Janetski, suggest that the subsistence practices, hunting patterns, and mobility strategies of those using the caves ca. AD 1100 to 1300 differed greatly from those of later peoples who used similar ceramics in the same region. While there are many potential explanations for these differences, this paper uses faunal data to argue that large game hunting, together with the mobility patterns of the animals hunted and transport decisions made by hunters living in the Promontory caves, may have adversely affected large game populations in the area and, as a result, prompted some proto-Apachean individuals to leave the Great Salt Lake region when large game populations became less reliable. Because of the heavy dietary focus individuals living in the Promontory Caves placed on large game, it is possible that when these individuals left the area, they followed migrating game, eventually ending up in new places such as the Dismal River region.

Johnston, Christine (Western Washington University)

[240] *Reinventing by the Wheel: Ceramic Networks and New Approaches to the Study of Political Economies*

This paper explores the value of network analysis as a method for the quantitative assessment of trade systems with the aim of profiling the structural nature of their associated political institutions. This study will focus on trade in the Eastern Mediterranean during the Late Bronze Age (ca. 1700 to 1200 BCE), and includes a network analysis of Cypriot and Mycenaean pottery circulated throughout Egypt, Cyprus, and the Levant. The analysis of ceramic distribution networks demonstrates a high degree of variability in consumption and import distribution systems across the regions of study. Network centralization and density measures indicate diverging mechanisms for import circulation, which coincide with the contrasting political institutions extant in this period. The networks of ceramic trade in Egypt and the Levant will be contrasted to examine the correlation between network measures and the surmised political structures in these two regions during this period. Results of this analysis will demonstrate the efficacy of network methods for the examination of political economy and traded materials.

[240] *Chair*

Johnson, Eric (Harvard University)

[261] *Measuring Household Wealth Using Mound Accumulation Rates in Skagafjörður, North Iceland*

Characterizing inter-household inequalities has long been a fundamental task of archaeology, but a fine-tuned measure of household wealth is often troubled by the inability to account for time or demographics in the archaeological record. This project tests the ways that Iceland, settled by Norse populations between AD 870 and 930, provides a temporally-sensitive mode of measuring household wealth through average rates of midden and architectural accumulations while also providing a context for studying the emergence of inequality in a previously uninhabited landscape. In 2014, a deep-coring survey of 11 occupational sites was conducted in the region of Langholt in Skagafjörður, Northern Iceland to supplement shallow-coring data previously collected by the Skagafjörður Archaeological Settlement Survey (SASS). With the aid of tephrochronology, volumetric estimates of cultural accumulations were generated in ArcGIS using site boundaries at AD 1104 as the aerial extent of cultural volumes. Site occupation duration before AD 1104 was then used to calculate average Viking Age accumulation rates. I argue that average accumulation rates can be used as a proxy for household wealth over time. Results confirm a strong relationship between accumulation rates and occupation duration of sites, suggesting that settlement order impacted inter-household inequalities over the longue durée.

Johnson, Erlend (Tulane), Ellen Bell (UC Stanislaus) and Marcello A. Canuto (Tulane)

[71] *Tracing the Emergence of Maya Lordship at Secondary Centers of the Copan Polity: An Examination of Residential Differentiation and Access at Centers in the Cucuyagua and El Paraiso Valleys*

In this paper we contend that Copan fundamentally transformed the political structures and social institutions of centers in outlying areas as it expanded and integrated these regions. Evidence from our areas of study, the Cucuyagua and El Paraiso valleys, suggest that these regions had long lived autochthonous populations prior to Copan's expansion into these regions in the Late Classic period. Using evidence from other non-Maya sites in Western and Central Honduras we contend that while varied political systems in these valleys lacked the same degree of social and political hierarchy typical of Maya culture. By examining how Late Classic period site layouts and residential patterns changed over time, we will evaluate to what degree Maya style political hierarchy was adopted in each valley. The data suggest that integration within the Copan polity an adoption of Lowland Maya style political relations led to significant structural changes that allowed local rulers to accrue greater wealth and prestige than had previously been possible. At the same time the degree to which these changes occurred varied from center to center, which may point to differing mechanisms and processes by which these institutions were introduced.

Johnson, Jack (Burke Museum, Univ. of Washington)

[51] *Chronometry at Bear Creek, a ~12,000-Year-Old Site in Western Washington*

Extant deposits at the Bear Creek site are highly compositionally variable, including fibrous peat, fluvial sands, volcanic tephra, and diatomaceous earth, reflecting a series of significant Holocene changes to the local environment. Multiple methods were used to directly date each of these sediments, including radiocarbon dating, single-grain IRSL dating of feldspar, OSL dating of fine-grained quartz, and tephra dating. Results from independent chronometric methods were then integrated with Bayesian analysis performed in OxCal 4.2 to allow statistical assessment of the stratigraphic compatibility of individual dates, to identify significant outliers, and to generate a comprehensive site chronology. Results show a high degree of success; individual dates were generally stratigraphically compatible, with excellent statistical agreement between independent chronometric methods. Results therefore firmly establish the antiquity of the early Bear Creek cultural component at ~12,000 years old and provide a detailed depositional history spanning roughly 9,000 years of local environmental change.

Johnson, James (University of Copenhagen) and Timothy Taylor (University of Vienna)

[76] The Emergence of the Bel'sk Settlement Complex: Landscape, Population Histories, and Social Structure

During the Pontic Iron Age, ca. 700–300 BCE, large fortified settlement complexes that encompass areas between 100 ha and 5,000 ha emerged along the forest-steppe and steppe boundary in Ukraine. At Bel'sk, the largest settlement complex of its kind with three separate settlements were linked by a fortification wall spanning 33 km, delineating a massive urban internal space from its hinterlands. Despite one hundred years of periodic archaeological investigation, much about the Bel'sk settlement complex remains an enigma, including its role in Pontic interregional or more localized socioeconomic dynamics. A collaborative Ukrainian-American-Austrian team, funded by the National Geographic Society, began new work at Bel'sk focusing on the analysis of remotely sensed imagery that allow us to explore population levels for each settlement, the construction of the fortifications, and the agropastoral land needed to support the settlement complex. Isotopic analyses of human and animal remains recovered from the cemeteries located at Bel'sk and beyond were also conducted to investigate the degree of mobility in human and animal populations present. In this paper, we discuss the important socioeconomic role of settlement complexes like Bel'sk in the movement of people and livestock in and out of the Pontic forest-steppe/steppe regions.

Johnson, Jay (University of Mississippi) and John Connaway (Mississippi Department of Archives and History)**[163] Pochteca from Cahokia, an Evaluation of the Implications of Mississippian Period Contact between the American Bottoms and the Northern Yazoo Basin in Mississippi**

Drawing primarily on data from the Carson Mound Group located in the Mississippi River floodplain of northwestern Mississippi, this paper considers the timing, duration, and nature of the substantial evidence for what appears to have been direct contact between the polity that centered on Cahokia and the people who built the mounds at Carson. Distinctive northern traits include raw material, lithic technology, projectile point styles, ceramics, and architecture. These traits appear for a very short span of time during the founding of Carson which is one of the earliest Mississippian Period sites in the northern Yazoo Basin. There is the suggestion that Cahokia played a role in the transformation of Woodland into Mississippian in this part of the Southeast.

Johnson, Katharine (Earth Resources Technology, Inc.) and Guido Pezzarossi (Syracuse University)**[218] Assessing Defensibility: Geospatial Analyses of Preclassic to Colonial Highland Maya Settlement Patterns**

Postclassic Maya settlement patterns have long been explained in terms of the increasing defensibility in the transition from Classic period settlement patterns. Drawing on arguments for the increased militancy and conflict that characterized the Maya region in the wake of the Classic "collapse," this narrative has endured despite minimal cross-context, large scale assessment. This paper presents the results of a large-scale, in-progress diachronic geospatial analysis of Maya settlement patterns, defensibility and agrosuitability from Preclassic to Colonial periods. Working from Edwin Shook's site survey data, we employ geospatial and statistical approaches to determine defensibility and its intersection with historic land use practices in order to provide cross-comparable and quantifiable data on changing site defensibility across multiple time periods and in different regions. While our results address and nuance defensibility and violence narratives, we also provide insight into the variable historical trajectories, experiences and motivations of diverse Maya communities reflected in heterogeneous settlement patterns.

Johnson, Kelsey, Heather McKillop (Louisiana State University) and Bretton Somers (Gulf South Research Corporation)**[281] Postclassic Obsidian Trade at Arvin's Landing, Belize: A pXRF Analysis**

Arvin's Landing is a Postclassic (AD 900–1500) settlement located on Joe Taylor Creek near Punta Gorda in southern Belize. The abundance of obsidian in the artifact assemblage at Arvin's Landing indicates trade from the Maya highland sources of obsidian. During the Classic period (AD 300–900), obsidian was transported along the coast and by inland routes to the Maya in the lowlands. There was a shift from a dominance on El Chayal obsidian in the Classic to Ixtepeque obsidian in the Postclassic. During the 2016 Underwater Maya lab season in Belize, we used a Bruker portable XRF machine to assay obsidian from Arvin's Landing in order to evaluate its role in trade. With the abandonment of inland cities in southern Belize at the end of the Classic period, the nearest Postclassic community to Arvin's Landing was the trading port on Wild Cane Cay, some 20 km north along the coast. Certainly there are similarities in obsidian source use between the two communities. In this paper we describe the site of Arvin's Landing, present obsidian source data for the site, and evaluate its role in Postclassic trade with Wild Cane Cay and beyond.

Johnson, Kent (SHESC/Arizona State University)**[245] Multiethnic Colonial Communities and Endogamy: Evaluating the Dual Diaspora Model of Moquegua Tiwanaku Social Organization**

The Moquegua Valley Tiwanaku colonial enclave was comprised of two Tiwanaku-affiliated populations: camelid agropastoralists who used Omo-style ceramics and maize agricultural specialists associated with Chen Chen-style ceramics. Despite living in close proximity, Chen Chen- and Omo-style communities maintained distinct social and cultural boundaries for several centuries. Goldstein's dual diaspora model suggests that Omo- and Chen Chen-style Tiwanaku colonists represent two separate but interconnected ethnic diasporas, comparable to maximal ayllus, whose members maintained affiliations with their ancestral homelands. Goldstein suggests that members of Chen Chen- and Omo-style maximal ayllu communities also maintained separate ethnic identities in part through endogamous marriage practices. This study evaluates the biological implications of the dual diaspora model. Biodistance and exploratory data analyses of basicranial and temporal bone landmarks are used to evaluate patterns of gene flow among samples of human skeletal remains from five archaeological sites in the middle Moquegua Valley, Peru. Overall, results suggest that maximal ayllu affiliation influenced gene flow within the Moquegua Tiwanaku colonies, but Omo- and Chen Chen-style communities were not strictly endogamous. While normative marriage practices favored maximal ayllu endogamy, there were exceptions to this general pattern. These exceptions were likely structured by myriad factors, including family-based social organization.

Johnson, Leslie Main [77] see Armstrong, Chelsey Geralda

Johnson, Marie (Brigham Young University)**[247] If It Were Your Grandma: A Tribal Perspective on NAGPRA in Utah**

In 1990, the Native American Graves Protection and Repatriation Act (NAGPRA) was passed. The passing of NAGPRA was a huge step forward for indigenous rights; the law allowed tribes to decide the ultimate outcome of Native American burials found in any context on federal or tribal land. In Utah, there are also state laws that require similar standards of protection on private land. That being said, the repatriation process can be long and painful for many tribe members who are concerned with the welfare of their ancestors. Oftentimes, tribe members must fight the interests of archaeologists to demand the respect that they feel their ancestors deserve. Through evidence gained from interviews with tribe members in Utah, I will show the perspective of the tribes on grave repatriation and NAGPRA associated practices. I will then present possible solutions for the problems raised by tribe members. Hopefully, this paper can help to create a culture of mutual respect and understanding between archaeologists and tribe members.

Johnson, Matthew (Central Washington University)

[343] Faunal Analysis of Two Columbia River House Feature Sites: Hole-in-the-Wall-Canyon (45KT12) and French Rapids (45KT13)

As part of ongoing thesis work, a taxonomic and taphonomic faunal analysis was completed for the zooarchaeological collections ($n \approx 5,000$) of two house feature sites, Hole-in-the-Wall Canyon (45KT12) and French Rapids (45KT13). Both sites are located near Vantage, Washington, within the inundated area of the Wanapum Reservoir, and date ca. 2400–200 BP. Originally excavated as part of large scale archaeological salvage work prior to dam construction in the summers of 1961–1962, the fauna was never analyzed. The study area represents a significant spatial gap in analysis and reporting of faunal data along the Columbia River. While fauna from house feature sites has been reported for areas to the north and south along the Columbia River, as well as for sites along the Snake River, almost no significant quantifiable faunal data has been reported for the Columbia between its confluence with the Wenatchee River (river mile 468) and Snake River (river mile 325). Preliminary identifications include deer, sheep, rabbit, dog, muskrat, sucker, salmon, minnow, and mussel, and further analysis is underway. The thesis will report on differences and similarities between the analyzed faunal collections and other reported house feature faunal assemblages along the Snake and Columbia Rivers.

Johnson, Meghan (Archaeological Investigations Northwest, Inc.) and Marci Monaco (Archaeological Investigations Northwest, Inc.)**[91] Dittman Cache Replication**

Experimental replication of the fourteen bifacial blanks recovered from the Dittman cache, site (35MA375) located near Salem, Oregon, provided information that will help answer numerous technological questions as research on the site continues. This study attempts to determine if the bifaces were prepared at the Dittman site or transported there in their current state of reduction. Our primary goal is to demonstrate what debitage would be present if the bifaces were manufactured at the site. Two sets of fourteen bifaces were produced in a controlled setting. One set by an experienced flintknapper and one set by two novice flintknappers. The individual reductions were timed, collected, and analyzed. Debitage was separated by size, type of termination and whether the platform was present, absent, or crushed. The replicated bifaces were compared to the cache bifaces and the debitage was analyzed by reduction stage. The experimental data can be used to determine if the bifaces were produced at the Dittman site. The data can also be used to answer questions regarding the reduction strategy, technological approach, implications of obsidian quality selected, possible skill level of the flintknapper, and to determine if the cache was intended for local use or trade.

Johnson, Nadia (Penn State) and Kenneth G. Hirth (Penn State)**[13] Altica and the Role of Middlemen in Formative Obsidian Exchange**

Altica's location, in the Patlachique Range 10 km away from the Otumba obsidian source, suggests a potentially significant role in the distribution of Otumba obsidian. Altica may have served as an important middleman and processing site in Formative obsidian exchange, but a greater understanding of the nature of these exchange relationships is required to define this role. This paper combines geochemical sourcing and technological data from obsidian from nine Early and Middle Formative sites, including Altica, in order to reconstruct the movement of obsidian in this period. The intent of this study is to identify the sources and consumption sites, as well as the physical form in which obsidian was transported—in rough cores, macroblades, or finished products. In doing so, the paper will assess role that intermediary sites like Altica could have played in the processing and distribution of obsidian into downstream sites.

Johnson, Victoria P. (NYU)**[305] Chair**

Jolie, Edward [373] see Webster, Laurie

Jolivet, Stephanie (Statistical Research, Inc.), Ross Smith (University of Oregon) and Shelby Anderson (Portland State University)**[47] Subsistence and Seasonality during the Thule Phase (ca. 1000 BP to Contact Era) at Point Spencer, Alaska**

Intensification of marine resource use is well documented over the last 1,000 years in northern Alaska, but the role of other resources in the subsistence economy is poorly understood. In order to better understand the full range of subsistence activities, and to reconstruct season of site occupation, we undertook analysis of faunal materials from several Thule Phase sites located on Point Spencer, Alaska. The subsistence remains from a large site near the tip of the peninsula (TEL-8) were found to be dominated by sea mammals, primarily ringed seals (*Pusa hispida*), with bird remains dominated by eiders (*Somateria* spp.) and other seaducks and mergansers. By contrast, least auklets (*Aethia pusilla*) dominated the bird fauna of the other sites along the peninsula, and fewer sea mammal remains were identified. These sites also contain large quantities of fish bone, in contrast to TEL-8 site where fish bones were extremely rare. The variety in faunal remains suggest that this region was an important subsistence gathering location across multiple seasons and that local diet was relatively diverse. These results contribute new data to a limited but growing body of research on diet and subsistence activities in Arctic hunter-gatherer groups over the last 1,000 years.

Jones, Ashley (Raba Kistner Environmental)**[109] Moderator****Jones, Emily Lena (University of New Mexico)****[251] Testing for Environmental Rebound: Untangling a Multicausal Event**

"Environmental rebound" has been proposed by a large number of researchers to explain the disjuncture between the reports of American environments by early Spanish explorers and the long-term human impacts evidenced in the archaeological record of North, Central, and South America. However, by definition environmental rebound may be caused by multiple factors: changes in human population numbers, settlement patterns, resource acquisition and/or land use may all have contributed to a rebound of environmental conditions to historically observed levels. The presence of these multiple potential causes as well as their intertwined nature makes it difficult to definitively demonstrate rebound in the archaeological record. In this paper, I review the literature (archaeological and other) on environmental rebound associated with the Columbian Exchange; explore the different ways scholars have tested for rebound; and assess the potential of different avenues for moving forward in understanding rebound events.

[165] Chair**Jones, Eric (Wake Forest University), Maya Krause (Wake Forest University) and Caroline Watson (Wake Forest University)****[79] Lithic Material Use in the Upper Yadkin River Valley and Its Implications for Southeastern Late Woodland Exchange Networks**

Mississippian and Piedmont Village Tradition (PVT) communities contemporaneously occupied the North Carolina and Virginia Piedmont and adjacent areas from AD 1100–1600. Discussions of trade and exchange, however, tend to focus on Mississippian political economies. Previous work at PVT sites has identified nonlocal lithic materials, some moving between Mississippian and PVT areas, suggesting a regional network that included both cultures. Our work focuses on the fourteenth-century Redtail site (31Yd173), a small, dispersed PVT settlement in the upper Yadkin River Valley. We compare

total proportions of local to nonlocal materials between Redtail and other sites in the valley to examine variations in material use over time and space. We also examine the context, spatial arrangement, and material type of different tools to understand how access to particular materials influenced their use at this site. This work provides new information on PVT exchange behavior, which is critical to understanding the complete scope and structure of Southeastern regional trade networks. The influence of Tom and Charlotte's approach to research, teaching, and mentoring is apparent throughout every aspect of this project, from the analytical methods to the collaborative approach that values undergraduate students as legitimate scholars.

Jones, George (Hamilton College)

[79] *Discussant*

Jones, Ian (University of California–San Diego), Mohammad Najjar (JoScapes) and Thomas E. Levy (University of California–San Diego)

[297] *Economic Strategies of Provincial Elites in Ayyubid Southern Jordan*

The late twelfth and thirteenth centuries AD in the southern Levant are a period of increasing political centralization, ending the political instability caused by the fragmentation of the 'Abbasid Empire in the tenth century AD. While the eleventh and early twelfth centuries are marked by near-constant shifts in political sovereignty, by the thirteenth century control was contested only between the Ayyubid rulers of Cairo and Damascus. A third center—Karak, in central Jordan—was, however, able to achieve political autonomy, if only briefly, during the thirteenth century, largely through maintaining economic autonomy. The elites of Cairo and Damascus recognized and attempted to disrupt this economic autonomy, but with only limited success. This paper presents evidence from recent archaeological research at one of the "nodes" of this economic strategy, the copper ore resource district of Faynan, in southern Jordan, where copper production saw a brief revival during the twelfth and thirteenth centuries AD. This strategy of maintaining political autonomy is also compared to other strategies that have been archaeologically and historically observed in the Levant both earlier and later in the Islamic periods.

Jones, Jacob [49] see Duelks, Jonathan

Jones, Jennifer (University of Minnesota Duluth)

[151] *Population Aggregation at the Early Bronze Age Settlement of al-Lajjun, Kerak Plateau, Jordan*

The University of Minnesota Duluth Project is working at al-Lajjun to understand the initial period of population aggregation in the southern Levant. At this time, settlements of 5,000–10,000 people, some with fortification walls, developed. The economic and political organization of these larger groups of people, whether hierarchical or heterarchical, competitive or cooperative, embedded in or separate from kin groups is under debate. Our research seeks to add to this discussion by detailing the intrasite location of craft production and the distribution of architectural features at one such third millennium site. Al-Lajjun is unburied by later settlement so the visibility of artifacts and architectural features offer a valuable space within which to experiment with intensive site survey and GIS mapping techniques. During our initial season, we identified two areas inside the fortification wall with concentrations of lithic debitage and established the feasibility of extensive artifact mapping. In our second season, we mapped and recorded at least 100 domestic and nondomestic architectural features visible on the surface of the site. Next steps include excavation to understand the function and sequence of occupation of the various structures and additional intensive survey to map the distribution of craft production across the site.

Jones, Jennifer (University of Cantabria), Ana B. Marín Arroyo (University of Cantabria) and Michael P. Richards (Simon Fraser)

[165] *Bioarchaeological Approaches to Reconstructing Upper Paleolithic Environments in the Cantabrian Region, Northern Spain*

The Cantabrian Region of Northern Spain was an important refugium during the harsh conditions of the Last Glacial Maximum, when ice sheets covered much of Northern Europe and populations were pushed further south. Late Upper populations in the Cantabrian region thrived at this time, and there is an increase in the density of archaeological sites is seen, in addition to cultural changes such as the creation of rich cave art assemblages. Understanding the climatic and environmental conditions experienced by humans and animals in the region is key to understanding the region's importance during the Upper Paleolithic. Specifically, what the environment like was on both an individual site level and regional level is crucial in understanding the conditions experienced by the humans living during the Upper Paleolithic. The use of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ stable isotope analysis of animal bone collagen from hunted ungulates, in combination with more traditional environmental proxies can produce detailed paleoclimatic reconstructions directly linked to the moments when these sites were being occupied. Results show that environmental and paleoclimatic changes were occurring in the region at this time, impacting on the behavior of Upper Paleolithic humans and animals, observable on an individual site level and regional level.

Jones, John G. (Archaeological Consulting Services) and Nicholas Dunning (University of Cincinnati)

[337] *Archaeobotanical Realities at Yaxnookah: A Pollen Grain of Truth on Preclassic Land Use*

Examination of sediments from several reservoirs at the Preclassic site of Yaxnookah Campeche, Mexico reveals less than stellar pollen preservation, but still useful botanical data. Thus far, pollen grains show varying degrees of degradation, requiring the use of exacting extraction methods. Cultigens and economic taxa are abundant in the samples demonstrating that we are sampling in the right place, but cyclic wetting and drying has resulted in the loss of fragile taxa, skewing the botanical record. Pollen data can still be obtained, but requires careful analysis and interpretation to identify past activities at this large, important site. Upcoming excavations will focus on the collection of sediments from additional reservoirs and wetlands rich in clay, where oxidation has been less damaging.

Jones, Terry (Cal Poly San Luis Obispo) and Al Schwitalla (Millennia Archaeological Consulting)

[286] *Cooperation and Violence in Prehistoric California: A Brief Interregional Evaluation*

Intergroup cooperation in prehistoric California has traditionally been evaluated via the relative intensity of exchange—tracked archaeologically with shell beads and obsidian. Transported great distances (most commonly via down-the-line exchange) trade items in abundance imply amiable intergroup relations, if not actual cooperation. Violence, on the other hand, as represented in the ethnographic and bioarchaeological records, is generally assumed to represent hostile interactions between individuals and groups. Models that consider these alternative interactive options generally assume that times of non-violence most likely coincided with increased intergroup economic cooperation (e.g., trade). In some instances intensity of violence indeed correlates with paleoenvironmental variability, specifically with upturns in violence during intervals of climatically-induced resource scarcity. Here we evaluate diachronic patterns in both trade and violence from several regions of California and find surprisingly that trade and some forms of violence did not necessarily alternate, but rather, at some times, co-varied, peaking simultaneously, and then declining.

Jones, Thomas (Archaeological Consulting Services)

[255] *Discussant*

Jones, Terrah (UCLA Cotsen Institute of Archaeology), Rachel Moy (UCLA Cotsen Institute of Archaeology) and Hans Barnard (UCLA Cotsen Institute of Archaeology)

[309] *Storage, Cooking, and Transport: A Preliminary Residue Analysis of Ceramics from Mai Adrasha*

This paper outlines the preliminary investigation of a collection of diagnostic and undiagnostic ceramics recovered from the site of Mai Adrasha, located in the Shire region of Ethiopia. Mai Adrasha is one of the largest and arguably most significant early town sites west of Aksum dating to the Pre-Aksumite to Early Aksumite periods (twelfth century BCE–second century CE) located in the Western Tigray. The site consists of a cemetery and a domestic area characterized by a collection of stone walls and ceramic and lithic assemblages. Study of this site will yield important information on the early prehistoric period and uncover insights into the social, economic, and political organization of the Aksumite polity and what preceded it. Our goal here is to present the initial results of a series of ceramic residue analyses conducted on a small sample of ceramics excavated by the UCLA Shire Project's 2015 field season. Each ceramic sherd was analyzed using gas-chromatography/mass spectroscopy (GC/MS) at UCLA. These results will help address questions concerning the production, consumption, and use life of ceramic vessels at Mai Adrasha, and will hopefully shed some light on Mai Adrasha's standing in the broader cultural landscape of Northern Ethiopia.

Jordan, Amy (University of Washington)

[36] *"Make little use of pots": A Review of Earthenware Assemblages from Three Nutmeg Plantations on the Banda Islands, Maluku Province, Indonesia*

In his 1544 voyage to Maluku, Galvao noted that residents "make little use of pots." Despite their purported "little use," earthenware is ubiquitous in Metal Age Malukan sites, but few detailed studies of these assemblages have been presented in the literature. In this paper, I reviewed the ceramic assemblages from multicomponent sites in the Banda Islands, Maluku Province, Indonesia. The Banda Islands were the world's sole source of nutmeg prior to the seventeenth century and was a center of early experimentations in European colonialism while concurrently being a node in a regional Asian trade network. The time periods of assemblages range from Neolithic to early twentieth century. The characteristics of tempers and designs of ceramics suggest differential access to the long distance trade network based around the Banda Sea and may be associated with changing social patterns associated with the global spice trading.

Jordan, Jillian M. (University of New Mexico)

[162] *Late Classic Ceramic Production and Communities of Practice at Uxbenka, Belize*

Archaeological approaches to ancient Maya communities often assume that spatially distinct architectural groups are tantamount to social groups, but proximity is likely not the only salient organizing principle. Members of prehistoric communities, like modern ones, defined the community in which they belong based on who they choose to interact with, which often lies at the intersection of kin, status, gender, ethnic, economic, and spatial affiliations. Employing a communities of practice theoretical framework, this paper examines the ceramic manufacturing process from resource acquisition to final production decoration using macroscopic and petrographic data. At least three households, located in three spatially distinct neighborhoods, likely participated in ceramic production during the Late Classic Period (AD 600–800). I analyze both low visibility (shared knowledge at the personal level) and high visibility (shared knowledge at a broad scale) on utilitarian ceramic vessels recovered from these households to understand the degree and nature of information exchange through an examination of the spatial distribution of the attributes among households and neighborhoods at Uxbenka. These data are used to evaluate spatial conceptions of intracommunity social boundaries and argues for a more interaction-based approach.

Jordan, Peter (Arctic Centre, University of Groningen, Netherlands)

[35] *Life beyond Circumpolar Cosmologies: New Themes in the Archaeology of Arctic Human-Animal Relations*

In Arctic Archaeology, human-animal relations have traditionally been studied in terms of ecology, optimality and adaptation; more recently, there has been growing interest in understanding how spiritual obligations affected treatment of circumpolar animals and their physical remains. Although these symbolic perspectives were initially useful, many tended to draw on ethnography, especially when using the concept of a single overarching 'Circumpolar Cosmology'; unfortunately, this can reduce prehistoric human-animal interactions into the same endless cycle of respectful hunting, reciprocal release of animating essences, and their eventual regeneration into new forms of life. This paper undertakes a critical reflection on the current state of Arctic human-animal studies, and concludes that we need to move beyond thinking in terms of fixed cosmologies, and engage more fully with the unique potentials of the long-term Arctic archaeological record. In fact, rather than a single timeless cosmology, these sequences provide abundant evidence for profound variability and endless transformation in the ways in which humans related to northern animals; at the same, time new scientific methods are transforming the depth, quality and diversity of information about these shifting relations, as well as their social and ecological contexts. Suggestions for future research priorities are presented in the conclusion.

[330] *Discussant*

Jordan, Peter [35] see Junno, Aripikka

Jorgensen, Mads [347] see Cheong, Kong

Jorgeson, Ian (Southern Methodist University)

[287] *Quantifying the Relationship between Geography and Social Networks*

Social Network Analysis (SNA) has become an important tool for archaeologists. However, unlike other social scientists who work with living populations, archaeologists do not have direct access to the social networks of ancient peoples. Instead, they rely on material culture to infer the presence, strength, and properties of social networks in the past. A standard approach is to compare assemblages of an artifact class among a group of sites, and quantify the similarity of those assemblages pairwise as a proxy for social networks. Pairs of sites with high similarity scores are inferred to be more strongly networked. For many artifact classes, the assumed link between assemblage similarity and strength of social network is well supported. However, this assumption is potentially problematic when assemblage similarity is based on geochemical sourcing of artifacts. In these cases, the distances between sites and the sources of the raw materials may do a better job of explaining patterns in assemblages among sites. This research develops a method for quantifying geographical similarity of sites to raw material sources using least-cost path analysis within a GIS framework, establishing a baseline of expected assemblage similarity given local geography, which can then be compared to the results of SNA.

Joseph Folan, William [349] see Domínguez, María del

Joslin, Terry [300] see Perry, Jennifer

Joyce, Arthur (University of Colorado at Boulder)

[82] *Landscape and Dietary Change in Formative Period Coastal Oaxaca*

This paper presents the results of an isotopic study of human dietary change during the Formative period (2000 BCE–300 CE) in the lower Río Verde Valley of Oaxaca. Approximately 60 individuals were sampled for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ using both teeth and long bones. The study examines trends in the consumption of maize and marine/estuarine resources relative to regional environmental change. Interdisciplinary research along the drainage system indicates that environmental change in the lower Verde was triggered by anthropogenic landscape change in the highlands. Geomorphological research in the Nochixtlán Valley in the Verde's upper drainage basin provides evidence for anthropogenic erosion due to land clearance for agriculture beginning in the Early Formative period. Paleoenvironmental research in the lower valley shows that the erosion in the highlands altered the drainage system, which led to an expansion of the agriculturally productive floodplain. Sediment discharged into the Pacific Ocean also contributed to the formation of bay barriers and back barrier estuaries. The expansion of the floodplain and the formation of the estuaries created highly productive habitats that may have contributed to population growth and dietary change. The isotopic study evaluates how human diet was affected by the changes in lowland environments.

[82] *Chair*

Joyce, Arthur [82] see Urcid, Javier

Joyce, Rosemary (University California Berkeley)

[357] *Death and the Origin of Enduring Social Relations*

Knowledge of Formative Period Mesoamerican archaeological sites often comes from narrow windows into buried sites. One feature has been a partial exception to this rule: burials. Groups of Formative Period burials, often accompanied by objects, have been recovered in many parts of Mesoamerica. Using models of mortuary treatment that saw burials as reflecting individual identity, burials provided one of the first ways researchers could examine the emergence of stratification within these settlements. Yet such analyses were open to critiques of the assumption that burial treatment was a simple reflection of social status and identity. In previous research on published burials from Tlatilco, I showed that clusters of burials there were products of social action by people associated with specific residential groups or neighborhoods within the settlement. I was able to demonstrate within-village variation not rising to the level of emergence of firmly delimited social strata but illuminating how stratification emerged, with intergroup distinction, age-related uniformity, and gendered trends evident in women's burials. This paper considers in detail the burial assemblages of males not previously analyzed, refining models that might be applicable more broadly in other Formative villages in the process of creating distinctions in wealth, status, and authority.

[178] *Discussant*

Juárez-Martin, Ana Itzel [119] see Bustos-Ríos, Diana

Judd, Veronica [335] see Craig, Douglas

Juengst, Sara L. (UNC Charlotte), Manuel Mamani (Universidad Nacional de San Agustín de Arequipa) and Karissa Deiter (Vanderbilt University)

[75] *Stress and Daily Life in an Andean Reducción Town: Preliminary Osteological Analyses of Juvenile Burials in a Church Sacristy*

Juvenile mortality and morbidity is a sensitive marker of overall group health, as juvenile individuals are more susceptible to circulating endemic diseases and nutritional stress. Thus, reconstructing relative frailty of the juvenile population at Mawchu Llacta provides important data about daily life at this colonial site, in a relatively understudied transitional period of Peruvian history. In this paper, we present the results of preliminary skeletal analyses of burials excavated from the sacristy at Mawchu Llacta. These burials included 21 individuals whose ages ranged between birth/infancy and eight years old. While preservation of the remains varied depending on depth of the burial, dentition and some cranial and long bone remains were well-preserved enough to allow for macroscopic, paleopathological analyses. We particularly focused on recording indicators of nutritional and/or immune stress (such as periosteal reactions, porotic hyperostosis, cribra orbitalia, and linear enamel hypoplasia) as a way to investigate overall frailty of the burial sample. Here, we present initial results and interpretations of this skeletal analysis, and suggest future projects that will help us more fully understand routine risk and stress experienced by people living at Mawchu Llacta.

Juengst, Sara L. [75] see Deiter, Karissa

Julig, Patrick (Laurentian University)

[216] *Traditional Wooden Structures on an Ancient Quartzite Quarry Site, Manitoulin Island, Canada*

Ancient quarry extraction locations on elevated bedrock outcrops continue to be used in the modern era for traditional activities such as constructing bent wooden sweat lodges and wooden shelters for fasting and meditation, which are built and maintained in modern times, over at least several decades. Other special "powerful" locations such as a cave in a Bar River Formation quartzite adjacent bluff are visited and used for spiritual activities by local First Nations members. As part of the sacred cultural landscape these topographically elevated quarry locations also appear to be "maintained," as broken glass from hilltop parties has been removed to clean the area. The continued traditional use for fasting and meditation may restrict other interpretive activities at such quarry workshop sites, as walking paths and visits by tourists are not too compatible with traditional activities such as fasting.

Júliússon, Árni Daniel [77] see Hicks, Megan

Jun, Ben [17] see Finkelstein, Aviva

Junge, Justin [257] see Anderson, Shelby

Junker, Laura (University of Illinois Chicago)

[41] *Battlefield Archaeology in Ancient Europe and Southeast Asia: The Challenge of Remote Histories and Personification of War Events*
Archaeological studies of 'warfare' in their cultural settings have multiplied over time and include analyses of fortifications, military equipment, warrior paraphernalia, and human skeletal trauma, usually spanning broad time scales and including diverse archaeological contexts (e.g., town walls, weapons production workshops, cemeteries) that are often remote from the actual locales where warfare is carried out. In contrast, 'battlefield' archaeology focuses on relatively temporally compact events occurring within actual fighting spaces and on the personal 'minutia' of battle experiences and outcomes for individual participants and factions. In the case of recent wars, a sizeable and diverse historical record and oral histories, more visible and better preserved sites, and a wider array of forensic science options have produced good results in not only identifying combatants, but also inferring the various factors (mechanical, environmental, and human decision-making) involved in war casualties. However, differing temporal scales, degrees of historical reference, and preservation of archaeological remains challenge battlefield archaeologists dealing with premodern war events. To illustrate the difficulties of reconstructing battlefield events in the distant past and investigating their impact on regional political and social landscapes, several case studies from Bronze Age and Iron Age Europe and pre-sixteenth century Southeast Asia are analyzed.

Junno, Aripekka (University of Groningen), Hirofumi Kato (Center for Ainu and Indigenous Studies, Hokkaido U), Sven Isaksson (Archaeological Research Laboratory, Department) and Peter Jordan (Arctic Centre, University of Groningen, PO Box 716)

[35] *Exploring Human-Animal Relations among the Okhotsk Culture in Northern Japan*

This paper investigates long-term human-animal interactions among Okhotsk cultures in Hokkaido, northern Japan. The Okhotsk Culture were maritime foragers and traders who expanded out from the Amur into Hokkaido and Sakhalin Island from about AD 600, with many of their distinctive traits and practices such as elaborate bear ceremonialism and other hunting rituals persisting into the historic Ainu cultures. Our ongoing research aims to understand the origins, spatiotemporal variability and long-term change in how communities living along the north coast of Hokkaido were 'bringing home animals' and subjecting particular terrestrial and aquatic species to specific processing and consumption practices. To trace the origins of some of these traditions, our study examines cultures that predate the Okhotsk, for instance the Late Jomon period. We are applying organic residue analysis of food processing technologies such as tools and pottery containers to elucidate how different marine and terrestrial animals were treated, for example, according to a common set of procedures or in terms of more specific beliefs for each species.

Jurgens, Christopher [126] see Hanselka, Kevin

Kabata, Shigeru [353] see Murakami, Tatsuya

Kaeding, Adam

[280] *Colonial Negotiation in the Frontier Province of Beneficios Altos*

The frontier location of the Spanish colonial province of Beneficios Altos, Yucatán provides a unique case study for investigation into the lives and strategies of colonial Maya individuals and communities. Given their proximity to a notoriously porous southern border and the documented record of significant numbers of people who escaped colonial authority by crossing that border, those communities and individuals living within the boundaries of Beneficios Altos can largely be considered to have remained by choice. A process of colonial negotiation carried out primarily through daily, mundane interactions between agents representing and/or opposing the interests of the Spanish Empire established the foundation by which residents of Beneficios Altos communities (both Maya and non-Maya) maintained and created distinct cultural and ethnic identities. This paper details the process of colonial negotiation and draws upon archaeological and documentary data to demonstrate examples of its effect on the Beneficios Altos population and landscape during the colonial and early national periods.

Kahn, Jennifer (College of William and Mary)

[278] *Houses of Power: Community Houses and Specialized Houses as Markers of Social Complexity in the Precontact Society Island Chiefdoms*
World-wide, communal houses and specialized houses represent hallmarks of social complexity. In precontact Society Island chiefdoms, social complexity was materially marked by architectural differences between elite and commoner residences. Yet perhaps more pronounced are architectural differences and varied spatial patterning between residential houses, communal houses, and specialized houses. This paper provides a spatio-temporal analysis of communal and specialized houses on the Ma'ohi landscape. Communal houses, notably fare manahini (elite meeting houses), fare 'arior (houses for the fertility sect), and fare ia manaha (houses for storing ritual items) differ from everyday residences in their large size, elaboration, and spatial proximity to ritual sites. Specialized house sites, including those for craft activities and those to house ritual practitioners, sometimes mimic residential houses in their size and architecture, yet have different suites of activities associated with site occupation. Tacking back and forth from the microscale to a landscape approach highlights how communal and specialized houses not only materially marked socioeconomic rank, but created landscapes of power, or landscapes of inclusion and exclusion based on one's rank and bounded status. In this way, communal houses and specialized houses serve as important hallmarks of increasing social complexity in the late prehistoric Society Island chiefdoms.

[19] *Discussant*

Kalaska, Maciej [316] see Druc, Isabelle

Kalawe, Keonelehua [43] see Rossen, Jack

Kalayci, Tuna (Institute for Mediterranean Studies, FORTH)

[57] *A Satellite Remote Sensing Model for the Ancient Traffic in Upper Mesopotamia*

Roads reflect motivations and needs behind many relations of past societies; they imposed spatial order on agricultural production, enabled transportation of bulk-goods, and mediated hegemonic power. Considered not only as the container of action, but also the action itself, the road has much more to say on the ancient movement praxis. This study focuses on Bronze Age roads (hollow ways) in Upper Mesopotamia. At this space-time, the movement embedded within production economies contributed to the formation of hollow ways. In pursuit of this phenomenon, the study constructs a typology of roads based on the volume of ancient traffic. Therefore, the aim is not only to document locations of hollow ways—the container, but to build a model for the movement—the action. It is hypothesized that variations in the ancient traffic differentially changed soil physical characteristics (soil compaction/moisture) so that past variation in traffic is still detectable on satellite data. In particular, CORONA is deployed for a remote sensing based archaeological survey of hollow ways. Next, Near-Infrared and Short-wavelength Infrared portions of the spectrum are exploited to generate proxy variables (vegetation/moisture indices). Finally, these proxy variables are used to model variations in ancient traffic on hollow ways.

Kalayci, Tuna [282] see Sarris, Apostolos

Kalisher, Rachel [252] see Fu, Janling

Kamenov, George [144] see Fitzhugh, Ben

Kamp-Whittaker, April (Arizona State University)

[315] *Moderator*

[111] *Discussant*

Kaner, Simon (University of East Anglia)

[25] *Discussant*

Kaner, Simon [396] see Nixon, Sam

Kang, Chang-Hwa

[24] *Early Historic Overseas Exchanges in Tamra, Jeju*

Overseas exchanges are a key interest in Jeju archaeology as several sites there document intricate networks in early historical periods. The term "Tamra" is first appeared in the "Samguk Sagi" (History of the Three Kingdom, 1145), and is widely believed to refer to political entities in Jeju. In archaeology, "Tamra" often refers to the period from c. 200 BC to AD 1105, and if further divided into three phases. The Tamra Formation period (200 BC–AD 200) marks a population increase and increasing social distinction among settlements. The Early Tamra period (AD 200–500), contemporaneous with the Three Kingdom period in mainland Korea, documents the integration of regional cultures, as manifested in the wide spread of the Gwakjiri-style material culture. The Late Tamra period (AD 500–1105) is recorded in early historical texts as a small state. Throughout the Tamra period, several sites show imported materials, including both utilitarian and prestigious goods. For example, the Formation period sites yield jade rings and Han Dynasty coins, while the Early Tamra sites reveal the Chinese celadon. The shift in trading patterns during the Tamra period reflects changes in social dynamics across the seas and rising social complexity in Jeju.

Kanik, Nadine (University of Winnipeg Department of Geography), Yadira Chinique de Armas (University of Winnipeg Department of Anthropology), Mirjana Rokсандic (University of Winnipeg Department of Anthropology) and Bill M. Buhay (University of Winnipeg Department of Geography)

[69] *Determining local marine reservoir effect ΔR correction factors for Cuba*

The atmosphere constantly produces radiocarbon, ^{14}C , which dissolves in the oceans as carbon dioxide. Theoretically, radiocarbon concentrations are equilibrated between the atmosphere, hydrosphere, and biosphere. However, in some regions old seawater at the bottom of the oceans returns significantly older radiocarbon dates as water sinks down the water column, causing the isotopic decay of ^{14}C to increase with depth. This creates a delay of ~200–500 years for the atmospheric carbon to be completely distributed through the ocean's water column, producing the Marine Reservoir Effect (MRE). This results in different radiocarbon content between terrestrial and marine organisms. In a local context, coastline shape, ocean bottom topography, currents, trade winds, and local climate, control the upwelling and mixing of deep and surface water. Radiocarbon dates obtained from biogenic calcite and aragonite precipitated from these mixed waters reflects a unique regional age variance, known as its ΔR value. Therefore, in areas of upwelling, marine carbonates are ^{14}C deficient and return radiocarbon dates that may be significantly older or younger than terrestrially dated materials of the same age. This study examines the local MRE and the associated ΔR correction factors for Cuba and discusses the implications of these for some Cuban archaeological sites.

Kansa, Eric (Open Context/UC Berkeley)

[227] *Big, Slow, and Linked: Toward Distributed and Scalable Data Practices in Archaeology*

This paper highlights the social challenges of bringing "Big Data" to archaeology. In the political economy of universities, corporations, and governments, Big Data enjoys a special status because it tends to require and reinforce institutional and information centralization. We often imagine that the research and analytic opportunities promised by Big Data are a function of the economies of scale offered by the centralized aggregation of fungible datasets. However, many forms of archaeological data are small but complicated, collected under very different conditions and sampling protocols. Moreover, archaeology has many different institutional stakeholders that create and manage data, making centralized aggregation more difficult. Because of these complications, this paper advocates a "Slow Data," incrementalist, approach to building Big Data. As illustrated by Open Context and other Linked Open Data providers, larger datasets can be assembled from data contributions scattered across the Web. While Linked Open Data (especially when combined with text-mining) offers paths for data aggregation, bringing together diverse data still involves potentially contestable judgement calls that require specialized knowledge, thought, and labor investments. Therefore, archaeological Big Data needs community-wide commitments to practice more open and more reproducible research.

[149] *Moderator*

[66] *Discussant*

Kansa, Eric [18] see DeMuth, R. Carl

Kansa, Sarah Whitcher (AAI/Open Context), Shawn Graham (Carleton University) and Eric Kansa (Open Context/UC Berkeley)

[18] *WTF Do API, JSON, CSV, and LOD Mean? Instruction and Professional Development in Digital Archaeology*

Digital data play increasingly prominent roles in archaeological research. At the same time, the Web has become the key medium for professional and public communication including the transmission of research data. The "Web of Data" represents a fundamental paradigm change. Increasingly, data are no longer packaged in discrete files (spreadsheets, database files) for download. Instead, many datasets come from dynamic information services (APIs, or Application Program Interfaces) and link with other data on the Web using Linked Open Data (LOD). While these services have the potential to transform our ability to visualize and understand data, many people are still struggling to move beyond basic use of spreadsheets. We present case

studies from the 2015–2016 Michigan State University Institute for Digital Archaeology (#MUSDAI) and the 2016 Open Context & Carleton University Prize for Archaeological Visualization to highlight how self-expression and building can promote data literacy and better professional practice.

[149] Moderator

Kantner, John (University of North Florida)

[147] Discussant

Kaplan, Jed (University of Lausanne)

[325] *Anthropogenic Land Cover Change over the Last 6,000 Years: How Can We Use Archaeology to Inform Global Models?*

Did humans affect global climate before the Industrial Era? While this question is hotly debated, the coevolution of humans and the natural environment since the last Ice Age had an undisputed role in influencing the development and present state of terrestrial ecosystems, many of which are highly valued today as economic, cultural, and ecological resources. Yet we still have a very incomplete picture of human-environment interactions over the last 21,000 years, both spatially and temporally. In order to address this problem, I am working as part of the PAGES LandCover6k/LandUse6k group to synthesize the archaeological record of demographic, technological, and economic development in the preindustrial world. These data are combined with a dynamic global model of land cover and human-environment interactions to quantify the magnitude and timing of global anthropogenic land cover change in the late Pleistocene and preindustrial Holocene. This integrated model is driven with paleoclimate from GCM scenarios and simulates global land cover and human land use change, fire, soil erosion, and emissions of CO₂ and methane (CH₄). My results highlight the importance of the long histories of both climate change and human demographic, economic, and technological history on the development of continental-scale landscapes.

[268] Discussant

Kaplan, Jed [38] see Kay, Andrea

Kaplan, Jessica

[222] *Obsidian in the Wari Empire: Sourcing Material from the Capital Using pXRF*

This paper examines the procurement and consumption of obsidian within the Wari capital (AD 600–1000) in the Ayacucho highlands of Peru. During the Middle Horizon, the Wari Empire expanded and controlled much of the Peruvian Andes, largely through the import, export and regulation of critical resources extracted from subject territories and populations. This project hypothesizes that obsidian may have operated as one such critical resource for imperial control and seeks to examine this hypothesis at the imperial capital of Huari. As part of ongoing dissertation research, analysis was conducted on obsidian collections of varying contexts deriving from the site of Huari, using X-ray fluorescence to determine the source location for each of the samples to explore varying temporal and spatial patterns of consumption of obsidian by imperial populations as well as the relationships between the capital and the hinterland regions from which the obsidian was extracted.

Kaplan, Molly

[14] *A Student's Perspective on the Unidentified Persons Project, San Bernardino, California*

Beginning in 2006 as a response to California Senate Bill 297, the Unidentified Persons Project is the first statewide attempt to apply modern DNA analysis to cold cases in San Bernardino County. In 2014 the project became an accredited field school through the Institute of Field Research and proceeded to have two consecutive field seasons in the summers of 2014 and 2015. This paper will present a student's perspective on the most-recent 2015 field season and will discuss both the rewards and challenges of the project. While providing a breakdown of the classroom, field, and laboratory components of the field school, this paper will also discuss the broader themes that emerged throughout the season, including the dynamics between students, professors, and law enforcement, and the realities of pursuing careers in forensic archaeology and anthropology. Overall, the Unidentified Persons Project is a profound initiative that gives back to the community and provides an incredible learning opportunity for its students. The field-school structure of the project should continue to be studied and treated as a model for other counties in California and other states looking to inspire similar initiatives nationwide.

Kaplan, Susan

[224] *What to Do about Avayalik Island 1: A Remote Central Place in the Paleoeskimo World*

In 1978 archaeologists partially excavated a frozen Middle Dorset Paleoeskimo midden on Avayalik Island, a far outer island at the tip of Labrador, Canada's uninhabited northern coast. They recovered hundreds of organic artifacts unlike any found in Labrador's other Middle Dorset sites, which contain only lithic tools. Faunal remains suggested a North Atlantic quite different from that of the present day. In 2016 Kaplan returned to Avayalik and documented the ongoing destruction of the site. Frozen deposits are thawing, compromising organics remains and destabilizing the terrace on which the site is located. Additional structures were identified, some slumping down the terrace's eroding faces. The 2016 visit also revealed that this remote place was a vibrant central place in the Dorset world. How should we respond to the deterioration of a site whose significance is not yet understood, given the major logistical and financial challenges of accessing the island and given that archaeometric techniques now are available to analyze it in ways not possible in 1978? How should northern archaeologists, funding agencies, and permitting bodies respond to site endangerment that stands to compromise our ability to ever understand the cultural and environmental history of the region?

Kardulias, Drosos N. [90] see Torpy, James

Kardulias, Paul Nick (College of Wooster) and Drosos N. Kardulias (Wooster High School)

[234] *Fluid Ethnoarchaeology: A Study of British-Era Water Fountains in Athienou, Cyprus*

The Athienou Archaeological Project (AAP) has conducted excavation and survey work in Cyprus since 1990. Ethnoarchaeological and ethnographic research have accompanied the other field investigations to create a holistic examination of the community situated at the southern end of the Mesaoria, a fertile agricultural plain in the central part of the island. The semiarid summer climate makes access to water a major concern of the residents of Athienou. A number of public fountains scattered throughout the town are a remnant of the British colonial presence in the twentieth century. In the summer of 2016, an AAP team recorded all of the extant fountains. Most of the water stations occur on a heritage corridor along which the municipality, with assistance from the national government, has restored a number of traditional structures. The fountains and the buildings together reflect an effort to preserve elements of past village life that are rapidly disappearing. In addition, the fountains are a modern example of the age-old effort to provide sufficient water in the region; in the Mallaou Valley south of Athienou, this aspect is reflected in a qanat system of underground channels cut through bedrock to provide water for people, livestock, and irrigation of crops.

Karges, Dylan [377] see Peacock, Evan

Kassabaum, Megan (University of Pennsylvania) and Ashley Peles (University of North Carolina-Chapel Hill)

[385] *Unusual Elements, Special Contexts: Bear Ceremonialism in Context at Feltus, Jefferson County, Mississippi*

During the Coles Creek period (AD 700–1200), people constructed three earthen mounds at the Feltus site in Jefferson County, Mississippi. Before, during, and after the construction of these earthworks, Feltus was a location for ritual gatherings characterized by communal feasts and ritual post activities. Archaeological investigations at Feltus produced not only a large amount of bear bone, but a range of skeletal elements that are unusual at prehistoric sites. The nature of these remains and their association with ritual gatherings makes clear that bears were particularly important to the people who gathered at Feltus. Throughout Eurasia and North America, preagriculturalists saw bears as people, albeit different-from-human people, who possessed the spiritual power to link the human and spirit worlds. Importantly for our interpretations of the Feltus data, bears are commonly seen as kin, as healers, and especially as food providers. The material remains of large feasting events including bear remains, pipe smoking, and the setting of large standing posts align remarkably well with traditional bear ceremonies. These findings not only help us to understand the origins and meaning of the activities taking place at Feltus, but also expand our understanding of the geographic and temporal extent of bear ceremonialism.

Kaszab-Olschewski, Tuende [282] see Wilke, Detlef

Kate, Emily (Pennsylvania State University)

[120] *A Preliminary Study of Epiclassic Diet at Cerro Magoni in Tula, Mexico, Using Stable Isotope Analysis and AMS Radiocarbon Dating*

In this paper, we present preliminary paleodietary data and radiocarbon dates for 12 burials recovered from Cerro Magoni, an Epiclassic (ca. AD 600–900) hilltop settlement in Tula, Mexico. Stable carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) analyses of bone collagen were used to assess the diet of individuals buried near the summit of the settlement. The production of bone collagen requires essential amino acids derived from protein, therefore stable carbon analyses reflect the origins of dietary protein, particularly C3, C4, and CAM (crassulacean acid metabolism) plants. Additionally, stable nitrogen values reflect trophic position in biological systems and can be used to differentiate between marine and terrestrial food sources. Finally, AMS radiocarbon dates of the burials will also be presented. These dietary data and radiocarbon dates will be further contextualized through a comparative discussion of our current understanding of food production and consumption in the Tula region during the Epiclassic and Early Postclassic (ca. AD 900–1200) periods. To our knowledge, this analysis is the first isotopic reconstruction of diet in the immediate Tula area and will provide the basis for future research regarding diet, migration, and identity in the Tula Valley during the Epiclassic period.

[120] *Chair*

Kater, Thiago [327] see Watling, Jennifer

Kato, Hirofumi (Hokkaido University), Ekatelina Lipnina (Irkutsk state University), Kunio Yoshida (University of Tokyo), Takao Sato (Keno University) and Dmitrii Lokhov (Irkutsk state University)

[332] *The Paleolithic Site Mal'ta in Eastern Siberia: New Discoveries and New Situation*

Mal'ta is located in southern part of Eastern Siberia, near Baikal. This site has been known as unique Paleolithic settlement, including a double human burial of two children, 30 human figurines carved from ivory, and 15 dwelling clusters. While the original interpretation of Mal'ta was that of a single cultural layer, recent investigations have identified over 10 cultural layers, dated between the OIS 3 to OIS 2 stage. Since 2010, we have continued the Russian-Japanese joint research for confirming the site formation process and high-precision AMS dating on Mal'ta site. In this paper, we would like to make a report on current results of new AMS dating and new situation from new excavation in Mal'ta site.

Kato, Hirofumi [35] see Junno, Aripekka

Katz, Jared (University of California, Riverside)

[347] *Creating and Curating a 3D Dataset: Establishing Categories for Ancient Maya Musical Instruments Using 3D Scans*

The Maya Music Project is dedicated to documenting ancient Maya musical instruments throughout the Maya area. Over the past year and a half the project has been documenting instruments housed in both archaeological laboratories and museums in Guatemala, Belize, and the United States in order to better understand the types of musical instruments that were played by the ancient Maya. At the time of writing this abstract, the project has worked with over 250 musical instruments, and has made 3D models of 98 of those instruments. In the fall of 2016, the project will be making 3D models of the instruments housed in the Museum of Fine Arts, Boston and the instruments housed in the Peabody Museum's collection at Harvard University. By performing typological analyses on these artifacts, interesting trends of stylistic attributes begin to emerge that were present throughout the Maya area. The project also played, recorded, and 3D printed playable replicas of many instruments, and has proven that the Maya had a sophisticated understanding of pitch. This talk will discuss trends of stylistic attributes, the sounds that the instruments can produce, and the role that 3D technology can play in this type of analysis.

Katzenberg, Mary A. (University of Calgary)

[237] *New AMS Dates for Paquimé, Northern Chihuahua, Mexico*

In an effort to resolve some long standing questions about the chronology of the site of Paquimé, accelerator radiocarbon dates were obtained from bone collagen of 77 burials. Bone samples were obtained as part of a larger project to explore life history and diet at the site. We address three questions: the temporal relationship between the Viejo period (Convento site) and Medio period (Paquimé), whether or not the “non-interred” individuals from the Medio phase at Paquimé date to the later occupation (the proposed Diablo phase suggested by Charles DiPeso), and the likely closing date of Paquimé. Making use of Bayesian modeling, our results indicate likely overlap between Convento and Paquimé, deposition of non-interred specimens throughout the Medio period rather than only toward the end, and a closing date for the site between 1423–1460 AD. We gratefully acknowledge funding through an Insight Grant from SSHRC and permission to study and obtain samples from The National Institute of Anthropology and History (INAH), Mexico and from the Centro Cultural Paquimé in Casas Grandes, Mauricio Salgado, Director.

[30] *Discussant*

Katzenberg, Mary A. [30] see Kwok, Cynthia

Kaufman, Brett (University of Science and Technology Beijing)
[279] *Discussant*

Kaufman, Brett [240] see Braekmans, Dennis

Kay, Andrea (University of Lausanne) and Jed Kaplan (University of Lausanne)

[38] *Modeling Human-Environment Interaction in Sub-Saharan Africa: Archaeological Data, Ecological Questions*

The African Iron Age transition is characterized by a shift from nomadic hunting and gathering societies to food-production, ferrous metallurgy, and centralized states and empires across most of the continent. Because of the magnitude and persistence of the change, understanding the African Iron Age is critical for assessing the present state and potential future of Africa's ecosystems. Because the transition occurred episodically and at different times in different regions, and because large parts of Africa are poorly studied archaeologically, unambiguous evidence for human influence on the environment is lacking in large parts of the continent. Thus, in order to better understand the process, pattern and impact of anthropogenic activities on the environment over the African Iron Age, we are developing a continental-scale quantitative model of human-environment interactions. This model is informed by archaeological data synthesis and information on the physical environment. Here I present a new series of maps of the distribution of livelihood systems in Iron Age Africa that are used to drive our quantitative model. The maps represent a synthesis of archaeological, archaeobotanical, linguistic, and ethno-historical data. While large data gaps still exist, my maps demonstrate the potential of using archaeological information for large-scale modeling.

Kay, Andrea [325] see Kaplan, Jed

Kay, Marvin (University of Arkansas), Justin Dubois (Department of Anthropology, University of Arkansas) and Devin Pettigrew (Department of Anthropology, University of Colorado)

[264] *Wear Traces from Some Experimental Chipped Stone Extractive Tools*

Experimental replicas of chipped stone sickle blades and both arrowheads and atlatl darts are used to evaluate (1) stages of sickle gloss formation as affected by moisture content of harvested wild grasses and domesticated rye cereal grains, and (2) armature impact and penetration wear traces. Herbaceous plant moisture content was calculated along with the total time of harvesting by wooden sickles mounted with stone prismatic blades. High speed digital photography recorded projectile flight paths and details of shaft rotation on impact and penetration of a domestic hog carcass. Other chipped stone knives were then used to skin and butcher the hog. The respective results show plant moisture content affects sickle gloss formation, and armature rotation on carcass impact and penetration is equally apparent in the microscopic wear traces. Pig blood residues and contrastive skinning/butchery wear is apparent too. These results have broad application to both New and Old World archaeology.

Kaya, Deniz (University of Notre Dame), Ian Kuijt (University of Notre Dame) and Meredith S. Chesson (University of Notre Dame)

[142] *Ritual Feasting and Its Social Implications: Analysis of the Ritual Pits at Dana-Bunar 2- Lyubimets, Bulgaria, during the Late Neolithic (5400–5000 BC).*

Keach, Levi (Desert Research Institute)

[107] *Howdy Podner! The Strange Story of Soda Bottles on a Cold War Battlefield in Southern Nevada*

In 2016, Desert Research Institute archaeologists identified 26NY15768, an artifact scatter consisting primarily of Vegas Vic brand root beer bottles dating to 1953. 26NY15768 is located in Frenchman Flat on the Nevada National Security Site, known as the Nevada Proving Grounds at the time of deposition. The Nevada National Security Site, under various names, has served as the United States' continental nuclear test site since it was withdrawn from the Las Vegas Bombing and Gunnery Range at the close of 1950. The location of this site is intriguing given the date. During 1953, two nuclear tests occurred on Frenchman Flat associated with Operation UPHOT-KNOTHOLE. I describe the site and consider possible explanations for its existence. Evidence for and against each explanation is drawn from historical documents and topographic analysis.

[107] *Chair*

Kealhofer, Lisa, Peter Grave (University of New England, Armidale, NSW Australia) and Ben Marsh (Bucknell University)

[27] *Changes on the Land: Gordion in the First Millennium BCE*

Throughout the first mill BCE, the inhabitants of Gordion engaged with multiple changes in political power and agricultural strategies, within a diverse landscape with shifting climate regimes. Over most of this period, the city, its industries, and its hinterland population thrived. Using multiple lines of evidence, both material and environmental, this paper explores what we know about changes in the organization of different production spheres at Gordion in order to understand how changing political and economic strategies intertwined with this diverse, dynamic, and unpredictable environment.

Kealhofer, Lisa [271] see Stark, Miriam

Kealy, Shmona [180] see O'Connor, Sue

Kearns, Catherine (University of Chicago)

[242] *On Some Classical Roots of the Anthropocene: Where Does Mediterranean Archaeology Belong?*

In the long run-up to deciding the Anthropocene's scientific status there have been few archaeological voices, as many have noted, revealing the proposed epoch's narrow periodization of human-environment relationships. None seem to be more absent than classical archaeologists, an omission which reflects not only disciplinary cleavages but also tacit conceits about the classical world as paradoxically generative of and divorced from modern geopolitics and human-nature interfaces. From the early arguments of George Perkins Marsh about humanity's ancient, unintended environmental degradation, to the trending fascination with climatic disasters in old world societies, however, past Mediterranean contexts have been foundational yet ambivalent sources in modernity's attempts to understand global anthropogenic change. At stake in efforts both to codify or to critically "provincialize" this anticipated era are thus important biases toward specific historical and material records. It is worth considering the Anthropocene's (and its challengers') oblique engagements with classical antiquity, given that so much of the rhetoric derives from the nature/culture discourse rooted in western

Europe (and America). This paper ponders the Anthropocene's imaginaries of nature and the human past that look askance at Mediterranean (pre)histories and archaeological evidence, and thus chiefly asks what an ancient Mediterranean critique of the epoch might offer.

Keddie, Grant [46] see Stewart, Kathlyn

Keefe, Earl [282] see Parker, Christopher

Keegan, William (Florida Museum of Natural History)

[32] *On the Edge of the New World: Colonizing the Bahamas*

The Bahama archipelago is the last place colonized in the New World, and the first encountered by Europeans. Previous efforts to explain the arrival of humans followed the stepping-stone model of expansion that began in the Orinoco River drainage of lowland Venezuela. Communities island-hopped through the Lesser Antilles, expanded into the Greater Antilles, and continued their northward migration through the southern Bahamas after crossing the last open water gap between Hispaniola and the Turks and Caicos Islands. We now know that none of this is true. The Bahamas are not visible from any of the surrounding land areas, most of which were first occupied from 10,000 (Florida) to 4,000 (Greater Antilles) years before the Bahamas (circa AD 700). In 1995, Berman and Gnivecki made the case that the central Bahamas were the first colonized by colonists that came from Cuba. This was not further explored because there was equal or better evidence that the southern Bahamas were colonized earlier from Hispaniola. Part of the issue is how archaeologists envision island colonization. This paper takes a fresh look at the processes of island colonization with specific reference to the Bahama archipelago.

Keegan, William [284] see LeFebvre, Michelle

Keehnen, Floris (Faculty of Archaeology, Leiden University)

[395] *Treating "Trifles": The Indigenous Adoption of European Material Goods in Early Colonial Hispaniola (1492–1550)*

This paper discusses the cultural implications of European materials recovered from early colonial indigenous spaces on the island of Hispaniola. The exchange of exotic valuables was vital for the emergent relationships between European colonists and indigenous peoples during the late fifteenth- and early sixteenth-century Caribbean. As the colonial presence became more pressing and intercultural dynamics more complex, formerly distinct material worlds increasingly entangled. Archaeologists have long given minimal attention to these material correlates of indigenous colonial transition. Nevertheless, more than fifty years of archaeological work in Hispaniola has revealed a select number of indigenous sites yielding such foreign artifacts, or objects with European influence, occasionally appearing in reworked, repurposed, or copied forms. Among these are glass beads, metal items, and glazed ceramics, found in a variety of contexts and ranging from singular finds to direct associations to indigenous valuables. This paper presents an overview of these findings in order to explore indigenous agencies in the ways of handling these objects related to the differential impacts of colonial power on the island. As such, this paper aims to advance our understanding of the materiality of things in these encounters and the transformations they brought about in indigenous material culture repertoires.

[395] *Chair*

Keenan Early, Erin

[181] *Applying ZooMS to Gault Site Faunal Material: Identifying the Unidentifiable and the Case for Database Expansion*

The Gault site is a well-known Clovis-age occupation site in Texas, with further evidence of pre-Clovis activity. In addition to an abundance of lithic artifacts, the site has yielded thousands of faunal remains. Unfortunately, the taphonomic processes to which these bones have been subjected have resulted in the vast majority of them being morphologically unidentifiable beyond small, medium, and large mammal. This greatly restricts researchers' abilities to understand the human-environmental relationships at this site. However, the application of the peptide mass fingerprinting technique ZooMS promises to allow for the reconsideration of these otherwise limited materials by opening the door to biomolecular identification to the genus or species level. Recent initial analysis of Gault faunal material from two areas of excavation has yielded results indicating that collagen preservation in some samples is sufficient to allow for ZooMS identification. These results demonstrate the need for the expansion of the reference database to include more North, Central, and South American species. Such an expansion would enable the reconsideration of otherwise severely restrictive faunal assemblages, and allow us to increase understanding of the earliest American's lifeways.

Keenan Early, Erin [345] see Lassen, Robert

Keeney, Joseph (National Park Service; University of Alaska Fairbanks) and Robert C. Bowman (Northern Land Use Research Alaska; University of A)

[257] *Testing Potential Archaeological Applications for Surficial Magnetic Susceptibility Probes in Shallow Depositional Environments: A Study from Agiak Lake in Alaska's Brooks Range*

Magnetic susceptibility (MS) is the measure of a material's potential to hold a magnetic field, the variation of which can indicate anthropogenic forces acting upon a substrate. In Alaska, diachronic MS analyses have been useful when investigating environmental change and anthropogenic variation through time in deeply-stratified subarctic interior sites. Synchronic MS approaches, on the other hand, use surficial MS probe mapping to analyze contemporaneous variation across space and can reveal shallow-buried cultural areas and features. Despite successful reports from European studies, synchronic MS approaches are virtually absent in the North American literature, especially from Alaska. This pilot study investigated surficial MS probing's potential as an efficient and less-destructive means for identifying past human activity areas and features within shallow depositional contexts such as those typical of Arctic Alaska. We selected Agiak Lake in Alaska's central Brooks Range for its expansive and well-documented mid-Holocene tent ring complexes and shallow depositional environment. Through the process of MS mapping and multiple means of verification, we were able to confirm anthropogenic signals related to the known features, identify multiple undocumented features within and away from visually-identifiable ones, and examine a potential method for assessing culturally-significant relationships between intrasite features.

Keen-Zebert, Amanda [191] see Pober, Rachel

Kehoe, Alice (Independent)

[393] *Following the Data for Long-Distance Travels*

Part of the postcolonial movement is recognition of long-distance trade and other interactions in the Americas. As late as mid-twentieth century, anthropology textbooks dichotomized the world between “progressive, dynamic” Western civilizations and “primitive peoples” alleged to remain isolated in small villages. Unilineal cultural evolution constructed by Enlightenment didacts and continued in Western “rise of civilization” histories and textbooks such as Johnson and Earle’s *Evolution of Human Societies* (2nd edition 2000) is closely connected to the Doctrine of Discovery (1493) legitimating European conquests and domination in the Americas. Ethnographic, ethnohistorical, and archaeological data, and indigenous histories, abundantly evidence cross-continental and sea travel routes in the Americas from paleoamerican times continuing to and after European contacts. Many railroad and highway routes today follow precolumbian routes. Plotting routes such as the Santa Fe Trail, and the distribution of linguas francas such as Mobilian Jargon can lead archaeologists to recognize precontact connections. Connections should also be premised for water routes—ethnohistorian Helen Tanner advised, “Look to the rivers!” and to their junctions with seas. This paper represents the “historical turn” taken by a growing number of American archaeologists thinking out of the box of customary American history reflecting Manifest Destiny ideology.

[311] *Discussant*

Kehua, Zhou

[333] *New Archaeological Discoveries in Sichuan Zhou Kehua: Sichuan Provincial Institute of Cultural Relics and Archaeology*

Recent years have seen a large number of archaeological discoveries in Sichuan; especially during the construction of the Xiangjiaba Hydropower Station in Yibin, Southern Sichuan, which led to four years of excavation covering an area of over 6,000 m². These excavations brought to light a large number of remains from the late Neolithic, Shang, Zhou, Qin, and Han periods, greatly advancing our understanding of local cultural developments. The present paper will introduce some of these recent discoveries, focusing on four main questions: 1) how these discoveries help fill the gaps in our understanding of the local cultural sequence; 2) how they elucidate the connection between the Three Gorges region and the Chengdu Plain during prehistoric times; 3) how the evidence pertains to the Shu expansion toward the south; and 4) how they enrich the amount of archaeological material available for the Han period.

Kelker, Nancy

[310] *Forgery and the Precolumbian Art Market*

Why forgery? “Because,” as Willie Sutton once said, referring to why he robbed banks, “that’s where the money is.” Forgery is a common problem in the art market with works by contemporary living artists as well as “old masters” having been and, continuing to be, faked. Some segments of the market, specifically precolumbian antiquities, are worse than others in the sheer number of forged and faked works being offered for sale in upscale galleries, online, and by independent, direct-to-the-collector dealers. The history of precolumbian art forgery is a long one beginning with the Spanish Conquest and steadily gaining in momentum after 1821. This paper will look at how the art market, historically and in modern times, drives the manufacture of forgeries, and at some of the modern producers and purveyors of these false works.

Keller, Hannah [152] see Sender, Rachel

Kelley, Alice

[224] *Discussant*

Kelley, Eric (University of Washington), Ben Marwick (University of Wollongong and University of Washing), Son Pham (Institute of Archaeology, Hanoi, Vietnam), Hoàng Diệp (University of Social Sciences and Humanities, Viet) and LamMy Dzung (University of Social Sciences and Humanities, Viet)

[113] *Geometric Morphometry versus Traditional Stone Artifact Typology in the Hoabinhian of Northern Vietnam*

Hoabinhian typologies dominate stone artifact analysis in discussions of late Pleistocene archaeology in mainland Southeast Asia. Although, the objective reality of the types in this system has been questioned, there has been little empirical work to test the usefulness of the commonly used types as discrete entities. We collect 3D scan models of 110 artifacts from Mau A, a recently excavated site in northern Vietnam, where the Hoabinhian was first described. We derive semi-landmarks along outlines in three planes for each artifact, and use Principal Component Analysis and k-means analysis on elliptical Fourier analysis coefficients to explore patterns in morphological clusters. We identify which outline is most informative for traditional types, and demonstrate that substantial morphological overlap is present between the traditional types. Our results reveal where continuities and discontinuities exist between the traditional types, and highlight the importance of recording measurements of continuous variables when collecting data from stone artifact assemblages.

Kelley, Jane H. [237] see Katzenberg, Mary A.

Kellner, Corina

[147] *Discussant*

Kelly, Bridget (Indiana University)

[137] *Linguistic Archaeology of the Sierra Sur, Oaxaca*

In this paper the potential for productive relationships between linguistics and archaeology is discussed in the context of the Sierra Sur region of Oaxaca, Mexico. The material remains of most traded goods decompose too swiftly to be studied hundreds of years after their circulation in trade networks. However, the vocabulary that describes these goods has the potential to survive in contemporary languages. Thus, comprehensive study of linguistic data can support historical and archaeological theories on the migrations of people, goods, and values. As a test case, research was conducted using the traditional comparative linguistic method and phylogenetic relations mapping software to trace phonetic changes in the Southern Zapotec spoken across five towns in the Sierra Sur. By comparing words for the trade items cited in previous archaeological studies of the region to Swadesh words (words which are considered to be borrowed less frequently), the towns could be tied to trade routes outside the Sierra Sur, connecting the Valley of Oaxaca to the Southern Coast. This paper will discuss how these findings relate to and pave the way for archaeological studies on the trade and migration of this understudied region.

Kelly, John (Public Archaeology Laboratory, Inc.)

[16] *A Pleasant Eighteenth-Century Surprise: The Postcontact Component of the SB 11 Site in Franklin, Connecticut*

In the summer of 2015, the Public Archaeology Laboratory, Inc. (PAL) conducted data recovery excavations at Susquetonscut Brook Pre-Contact Site 11 (SB 11), a multicomponent site in Franklin, Connecticut. Prior archaeological investigations had produced a high density of precontact artifacts, but very few artifacts that would have suggested a sizeable postcontact occupation. However, the data recovery yielded 1,798 postcontact artifacts, revealing a substantial postcontact component to the site. Diagnostic artifacts indicate that the postcontact component at SB 11 is early to mid-eighteenth-century, although the postcontact occupation may have begun in the late seventeenth century. This paper presents an assessment of the postcontact assemblage from SB 11 and explores how the site fits in the context of early eighteenth-century settlement in the New London and Norwich area of southeastern Connecticut. This research also seeks to investigate how the material culture at SB 11 might offer insight into the recognition of postcontact sites that do not have extant foundations or other surface features.

Kelly, John (Washington University) and James Brown (Northwestern University)

[283] *Redefining Cahokia: City of the Cosmos*

By the early nineteenth century the group of mounds we now recognize as Cahokia mounds was called the Cantine mound, with Monks Mound referred to as the "Great Cahokia" mound. Actual boundaries for the site were not established until the 1950s. For the inhabitants, the site was probably without bounds and our definition of Cahokia is to a large extent fulfills our society needs that relate to legal aspects of ownership and historical significance. The natural landscape is a palimpsest of features related to its creation by the Mississippi river and its tributaries. At this point Cahokia is composed of at least 110 earthen mounds and other visible architecture and modification of the natural landscape within an area of about 13 km² that has been altered to varying degrees over a period of over centuries. As Eastern North America's initial urban center, this presentation focuses on the nature of its definition from a landscape perspective and as an American Indian cosmogram and in the end the manner in which it has changed as it defies our attempts to define this unique place we now call Cahokia.

Kelly, Kenneth (University of South Carolina)

[370] *Seeking Out Slavery in Colonial Saint Domingue (Haiti)*

Saint Domingue was the most important European colony of the Caribbean region, producing vast amounts of wealth through the labor of enslaved Africans and their descendants. It was also the setting of the only large scale slave revolt that succeeded in overturning the slavery system. In spite of this importance to Atlantic studies, African Diaspora studies, and historical archaeology, very little substantive research has been conducted on sites associated with the dwelling places of the enslaved laborers. In summer of 2016, I traveled to Haiti and surveyed nearly 30 plantation sites to determine if the slave villages could be identified, and their potential for contributing toward developing comparisons with other slave-based colonies of the French colonial world. This paper presents the results of that research.

[64] *Discussant*

Kelly, Robert L. (University of Wyoming)

[227] *The Challenges and Prospects of Developing Radiocarbon "Big Data" for the Study of Prehistoric Demography*

The use of large radiocarbon datasets has the potential to transform archaeology and its place in the social and natural sciences in the coming decades. Radiocarbon "big data" enhances the unique contribution of archaeology to reconstruct human demography over vast spans of time. This move toward big data is confronted by some central challenges in archaeological method and theory, such as the use of legacy data of disparate quality and working over broad spatial and temporal scales. For some, these challenges pose insurmountable barriers to the use of radiocarbon big data. We disagree: radiocarbon big data can be used with appropriate kinds of questions, ones that concern processes working at broad temporal and spatial scales. This presentation discusses our ongoing work to develop a radiocarbon database for the United States, focusing on the problems of data collection and potential for using these data to ask questions regarding long-term human demographic change, human-environment interactions, and cultural dynamics.

[227] *Chair*

Kelly, Robert L. [81] see Robinson, Erick

Kelterbaum, Daniel [221] see Schlotzhauer, Udo

Kelvin, Laura [172] see Hodgetts, Lisa

Kemp, Brian M. [86] see Hofman, Courtney

Kendall, Heather [50] see Buff, Lindsay

Kenna, Lachlan [40] see Mackay, Alex

Kennedy, Chris J. [134] see Tripcevich, Nicholas

Kennedy, Ryan (Indiana University), Guido Pazzarossi (Syracuse University) and Tamar Brendzel

[159] *The Fish of Fort Morris: A GIS-Based Study of Human-Environment Interaction during the American Revolutionary War*

Situated at the mouth of the Medway River in coastal Georgia, Fort Morris provided protection for the bustling port city of Sunbury. During the Revolutionary War the fort was first controlled by American forces and later by the British, and while the fort's history is well-known in local lore archaeological analyses are shedding new light on everyday life at the site. This paper draws on the identification of fish bones to provide an inventory of the fish taxa consumed by soldiers at the fort on both sides of the conflict. Because soldiers often collected fish while on patrol or in their spare time, the taxa present can provide substantial clues to reconstructing movement and food collection in the past. We present GIS-based analyses that link the identified fish taxa and their respective biological and environmental needs to bodies of fresh, brackish, and marine water in the vicinity of the fort. We combine these data with least cost path and viewshed analyses to understand soldier movement near Fort Morris during a time of war. Ultimately, we demonstrate how something as simple as fish bones from the garbage of Revolutionary War soldiers can directly reconstruct their physical movements through past landscape.

Kennedy, Sarah (University of Pittsburgh)
[331] *Chair*

Kennedy-Richardson, Karimah [334] see Martinez, Desiree

Kennett, Douglas J. (Penn State) and Brendan Culleton (Penn State)

[9] *Studying Past Human-Environment Interactions with High-Precision AMS 14C at Penn State*

The newly established PSU AMS Radiocarbon (14C) Facility provides high-precision measurements of 14C content in a wide range of carbon-bearing materials. Our primary mission is the study of human-environment interactions in the past and present with the goal of working with archaeologists in the context of inter-disciplinary environmental research. The facility operates a NEC 1.5 SDH 500kV Tandem Pelletron accelerator optimized for relatively small samples, requiring only 700µg of graphitized carbon, with a potential lower limit of 15µg C, with routine precision of 20–25 14C years for samples less than 10,000 years old. We provide expertise in sample collection, research design, Bayesian chronology building, and the chemical preparation of archaeological samples with special expertise in the purification of bone collagen. We highlight recent projects in Alaska and the Maya Region.

[162] *Discussant*

Kennett, Douglas J. [8] see Buckley, Gina

Kenoyer, Jonathan (University of Wisconsin)

[177] *Plant-Based Textiles and Basketry at Harappa, Pakistan (3700–1900 BCE)*

Excavations at the site of Harappa undertaken by the Harappa Archaeological Research Project between 1986 and 2010 have recovered a wide variety of artifacts relating to plant based textiles and basketry from between 3700 to 1900 BCE. This paper will present the results of the analysis of archaeological evidence and experimental studies used to develop more accurate interpretations of the nature of early plant based fibers and basketry. Woven textile impressed terracotta beads and spindle whorls provide evidence for spinning and weaving from the very earliest occupations at the site during the Ravi Phase (3700–2800 BCE). Spindle whorls as well as coiled and woven basket impressions in the soil have been recovered from the Kot Diji Phase (2800–2600 BCE). During the urban Harappa Phase (2600–1900 BC) charred fibers, pseudomorphs preserved on copper and silver, as well as impressions of textiles in clay and faience provide evidence for wide range of textiles and fibers. Fabric impressions on pottery and actual fibers preserved in clay are also found in the Late Harappan Phase (1900–1300 BC). When combined with the paleoethnobotanical record from the site, these data provide a unique perspective on the development and changing nature of textile production at Harappa.

Kerchusky, Sarah (University of California, Santa Barbara)

[170] *INAA of Loro Ceramics from Zoropata, a Middle Horizon Las Trancas Habitation Site in Nasca, Peru*

Early in the Middle Horizon (c. AD 650–1000), the Wari Empire expanded from its Ayacucho homeland and established at least three colonies (Pacheco, Pataraya, and Inkawasi) in the Southern Nasca Region (SNR) on the South Coast of Peru. Concomitant with the Wari presence local settlement patterns underwent dramatic reorganization. Large portions of the population shifted from the Nasca and Taruga Valleys south to the Las Trancas Valley—away from and perhaps in contention with the Wari. A new polychrome fineware ceramic style, Loro, was developed and constituted a significant stylistic departure from Early Intermediate Period (EIP) (c. AD 0–650) Nasca ceramics. Unlike the polychrome finewares from previous periods, Loro pottery was thicker, heavier, rougher, less colorful, and less polished. This paper discusses archaeological data including Loro and EIP ceramics, lithics, architecture and mapping data, and surface artifacts recovered during the 2014 excavations at the site of Zoropata in the Las Trancas Valley, Nasca, Peru. Zoropata was identified as a relatively large (c. 30,000 m²) domestic site with possible ceremonial function occupied during the EIP and early Middle Horizon. These data enable further investigation into the changes Nasca culture underwent from the later EIP to the early Middle Horizon.

Kersel, Morag (DePaul University)

[141] *Good Collectors of Archaeological Artifacts from the Holy Land?*

In an ideal world there would be no looting, selling, or collecting of archaeological artifacts. But, given the centuries old lure of material from the Middle East, it is unrealistic and naïve to think that there will be a cessation of collecting. This desire for Holy Land antiquities has resulted in a bifurcated community of consumption: those willing to purchase undocumented artifacts, and Good Collectors, the discerning individuals and institutions who ask questions about archaeological find spots, export licenses, object biographies, and owner histories. Ideally, Good Collectors will return material to countries of origin if it is discovered to have been stolen or illegally exported. They will only buy suspect material as a last resort when items are under threat, thereby acting as safe havens for the benefit of society. Using research into the acquisition of Holy Land artifacts, this paper will argue that there is such a thing as a Good Collector, and that archaeologists need to collaborate, engage, include, and work with collectors in order to improve our understanding of the trade in legal and illegal antiquities.

Kerwin, Ruby (Arizona State University) and Sarah Klassen (Arizona State University)

[113] *Developing Typologies of Temple Features of Angkor, Cambodia.*

Over 1,400 temples have been identified surrounding Angkor, the capital of the medieval Khmer Empire (ninth–fifteenth centuries CE) in present-day Cambodia. Some of these temples contain inscriptions and are easily dated, though many temples are lacking inscriptions and the associated chronological information. In this poster, we inventory and develop typologies for four types of temple features: pedestals, lintels, colonettes, and door frames. We use these diagnostic features to identify relationships of potential chronological significance between temples. Finally, we use geographic information system analyses of these patterns to determine the spatial distribution of temples and their associated diagnostic features, gaining broad insights into the chronological development of Angkor.

Kessler, Nicholas (University of Arizona)

[368] *Remotely Sensed Seasonal and Interannual Variability of Vegetation and Temperature Indices from Ancestral Pueblo Fields in the Lower Rio Chama Basin, New Mexico, USA*

An analysis of multispectral satellite imagery in the lower Rio Chama basin, in northern New Mexico, reveal that seasonal patterns of vegetation cover (NDVI) are significantly altered by Prehispanic agricultural features surrounding ancestral Tewa pueblos. Interannual variability of NDVI on previously cultivated upland surfaces is similar to a model derived from terrain attributes of minimally-modified watersheds. However, in relict agricultural fields late-summer and autumn NDVI tends to be higher, and temperatures somewhat warmer, than expected. Though there is some uncertainty, this effect

appears sensitive to seasonal patterns of precipitation. These observations are important for better understanding the function of prehispanic agricultural features in the upper Rio Grande, the use of which is undocumented historically. This knowledge has implications for contextualizing the Tewa ritual and agricultural works cycle, models of the resilience of late Classic communities in the Upper Rio Grande to environmental perturbation, and the long-term ecological legacies of past anthropogenic environmental modification.

Keyser, James (Oregon Archaeological Society)

[175] *Cheval Bonnet: A Crow Calling Card in Blackfeet Country*

Cheval Bonnet is a small petroglyph site on Cut Bank Creek, just east of the Blackfeet Indian Reservation that shows a Crow Indian coup counting scene and three other horses, two of which can be identified as the products of Crow artists by their form and the stylized war bonnet worn by each animal. Located in a hidden canyon adjacent to a major stream crossing, the site represents a "calling card" similar to other biographic images drawn both as petroglyphs and arborglyphs during the late Historic period.

Khaing, Kyaw [333] see Marwick, Ben

Khamis Ali, Abdallah [307] see Alders, Wolfgang

Khanjian, Herant [78] see Ma, Xiao

Khartanovich, Valeriy I. [330] see White, J. Alyssa

Kiazyk, Hillary (Western University and Sustainable Archaeology)

[258] *Archaeology, Accessibility, and 3D Imaging*

The recent incorporation of 3D imaging into the field of archaeology has opened many doors with regard to accessibility of archaeological materials. While this promotes research by inviting a much broader research discussion, it also poses questions of ownership of materials. This poster will explore new ways that archaeologists, descendant communities and people of the general public are now interacting with archaeological materials as well as some of the challenges, benefits and problems associated with these platforms. This poster will examine the effects of 3D scanning and printing, 3D social media platforms such as Sketchfab and legal implications of this wide availability of cultural history on the field. It will also explore the ways in which this technology is being used and could be used in the future to make archaeology more accessible.

Kidder, Barry (University of Kentucky), Scott Hutson (University of Kentucky), Jacob Welch (Yale University), Daniel Vallejo-Cáliz (University of Kentucky) and Shannon Plank (University of Kentucky)

[329] *From Household to Polity: (Dis)integration along the Ucí-Cansahcab Causeway in the Northern Maya Lowlands*

Over the past decade, the Ucí-Cansahcab Regional Integration Project (UCRIP) has utilized multiples scales of analysis, from broad household excavations to large swathes of lidar collection, to examine the social processes of community (dis)integration of a polity in the northern Maya Lowlands. This polity, headed by Ucí, was integrated by an 18 km long intersite causeway system by the Terminal Preclassic and connected the emerging regional capital with three secondary sites. Extensive test pitting from monumental and household contexts at Ucí and other sites, both on and off the causeway, allow for comparing economic practices and household identities during this political shift. Recent excavations from Ucí clarify the chronology of the regional capital and indicate an apex during the Terminal Preclassic as well as a relatively robust "Protoclassic" ceramic presence, such as experimental forms and decorative embellishments. The presence of a structure with iconography indicating rulership and a high quality of life of the households at the secondary site of Ucanha underscores the successful integration of this region during this period. However, by the first few centuries into the Early Classic Ucanha experiences a decline, although Ucí does not, thereby showing integration and disintegration are variable even at the regional scale.

Kidder, Tristram (Washington University)

[110] *Discussant*

Kidder, Tristram [325] see Qin, Zhen

Kidwell, Jasmine (Eastern New Mexico University)

[345] *Modeling Channel Morphology at the Clovis-Type Site, Blackwater Draw, New Mexico*

Blackwater Locality No. 1 (the Clovis-type site) served as a catchment for spring-fed streams during the late Last Glacial Maximum (~19,150–12,900 cal yr BP), providing a water source for the Paleoindian occupants of the Southern High Plains. During episodes of high effective moisture, water flowed out of the basin via an outlet channel into Blackwater Draw proper. Coinciding with the changing climate of the early Younger Dryas (~12,900–11,500 cal yr BP), the flowing waters of the outlet channel were obstructed, impounding the waters of a shallow lake. This study uses the distribution of well-defined stratigraphic boundaries to create a series of surface models corresponding to the Clovis, Folsom, and Late Paleoindian occupations at the site. Stratigraphic data and sediment samples were collected from systematic hand augering of the outlet channel. Where the surface models indicate pronounced changes in the channel, sediment samples were more intensively analyzed to identify their origin and depositional environment. The models, coupled with sedimentary data, shed light on the processes responsible for ponding of the lake and provide snapshots of the changing morphology of the outlet channel, ultimately contributing to a richer understanding of the changing landscape during this critical time in prehistory.

[6] *Discussant*

Kieffer, C. L. (Museum of Indian Arts and Culture, University of New Mexico) and Jack Baker (University of New Mexico, Anthropology)

[8] *Statistically Comparing Demographic Distributions of Mortuary Assemblages*

This analysis includes data from 50 archaeological mortuary assemblages variously attributed to sacrifice, warfare, and standard mortality processes. The research compares two sites, both attributed to sacrifice, to those produced by the two alternative processes of warfare and standard mortality and explores the question of whether these assemblages may be differentiated from them based on the age distribution of deaths. The analysis incorporates a novel feature in that preservation bias is directly modeled using monte carlo experiments. The results suggest that the two sacrifice assemblages (Midnight Terror Cave, Belize, and Chichén Itzá, Mexico) do not differ significantly from a small-scale horticulturalist reference model of mortality

proposed by Gurven and Kaplan (2007), but do differ significantly from other sites in the sample in the proportion of the assemblage comprised of 6 to 10 year olds at the site of Midnight Terror Cave. This finding is in line with ethnohistoric and ethnographic accounts that indicate children were often selected for sacrifice to the Maya rain gods in caves and cenotes.

[66] *Discussant*

Kielhofer, Jennifer (University of Arizona)

[279] *A Soil-Stratigraphic Record of Landscape Evolution and Human-Environment Interaction at the Yanggouzhai Archaeological Site, North-Central China*

This paper presents the results of soil-stratigraphic investigations and stable isotope analysis at Yanggouzhai, a Middle Neolithic site (~5500 cal. years BP) in the Wei River Valley of north-central China. At Yanggouzhai, there is a well-preserved sequence of alternating sediment and buried soils, indicative of multiple fluctuations in landscape stability. Human occupations are associated with three buried soils: the two lower soil horizons contain Middle Neolithic (~6000–5500 cal. yrs. BP) artifacts and features, while the upper horizon contains Han Dynasty artifacts (~2500 cal. yrs. BP). Unweathered sediment between these buried soils may signal heightened flooding and floodplain deposition during the Late Holocene. Stable isotope analysis on bulk soil and sediment carbonates offers insight on Middle Neolithic paleovegetation and paleoclimatic conditions. $\delta^{13}\text{C}_{\text{org}}$ values range from -4.76 to -7.83‰ , reflecting a higher proportion of C3 biomass within a mixed C3/C4 ecosystem. Agricultural cultivation of millet during the Neolithic may be responsible for the C4 signal. $\delta^{18}\text{O}_{\text{org}}$ values range from -8.13 and -9.48‰ , suggesting strong summer monsoonal conditions. Based on these analyses, Middle Neolithic groups at Yanggouzhai experienced warm summer temperatures, strong monsoonal rainfall, and seasonal climatic variation. However, human activities (agriculture) may have influenced pedogenesis and the isotopic signature of carbonates.

[6] *Discussant*

Kielhofer, Jennifer [279] see Fox, Mathew

Kiesow, Danielle (Indiana University of Pennsylvania)

[17] *Reservation Archaeology in an NPS Setting: Native-White Relations and Land Use on the Grand Portage Reservation, 1854–1930*

Grand Portage National Monument (GRPO) is located within the Grand Portage Reservation in Northern Minnesota and is primarily concerned with interpreting the events and impacts of the fur trade in the eighteenth century. In an effort to increase Grand Portage Ojibwe representation and in compliance of Section 110, GRPO conducted archaeological excavations in the summer of 2016 of the historic yard of a Bureau of Indian Affairs (BIA) building to explore land use and plant use throughout time and to better identify the occupation of the building. The Grand Portage BIA Complex excavation is one of the first efforts in Grand Portage to learn more about the history of the Reservation and history of BIA occupation on a local and regional scale. Preliminary results of the study discuss the artifact assemblage from the yard and house waste found in the four excavated units, the soils in and around the site, phytolith analysis taken from soil samples in the units and outside the site, and historic documentation from BIA employees. Additional consideration is given to the differences in soils and artifact assemblages from the Grand Portage BIA Complex site and 21CK12, located within the vicinity, that highlight differences in socioeconomic lifestyles.

Kikiloi, Kekuewa [302] see Graves, Michael W.

Kilgore, Gertrude (Texas Tech University), Brooke Bonorden (Texas Historical Commission) and Brett A. Houk (Texas Tech University)

[280] *Machetes, Metates, and Majolica: San Pedro Maya Involvement in the Colonial Economy at Kaxil Uinic Village, Belize*

Following the outbreak of the Caste War in the Yucatán (1847–1901), a group of San Pedro Maya established the village of Kaxil Uinic in northwestern Belize (formerly British Honduras). In the wake of the Battle of San Pedro between British and Maya forces in 1867, the Lieutenant Governor of British Honduras issued a decree to delegitimize San Pedro Maya claims to land, undermining their subsistence economy and forcing them into wage labor for the logging and chicle industries. O. Nigel Bolland (2003:111) characterizes the period during which Kaxil Uinic was inhabited (ca. 1880–1931) as the consolidation of British jurisdiction over the Maya and their incorporation into the colonial social structure. A critical analysis of archaeological and archival data gathered over two field seasons reveals that the inhabitants of Kaxil Uinic selectively participated in the colonial economy according to their needs. Strategic interaction with logging firms, the chicle industry, and the colonial administration allowed the residents to maintain some social, political, and economic autonomy through the supplemental use of imported goods and cash alongside locally made tools and vessels. Data from Kaxil Uinic demonstrates this amalgamation of indigenous and European technologies, where residents navigated the ever-changing cultural landscape of British Honduras.

Killebrew, Ann E. [151] see Skinner, Jane

Killick, David (University of Arizona) and Frances Hayashida (University of New Mexico)

[164] *Lung-Powered Copper Smelting on the Pampa De Chaparri, Lambayeque Department, Peru*

We report here the archaeometallurgical analysis of residues associated with two banks of four lung-powered copper smelting furnaces at site 256AO1, discovered during Hayashida's full-coverage survey of the Pampa de Chaparri in 2008. Calibrated radiocarbon dates place the operation of the furnaces in the Middle Sican period, ca. 1000–1200 cal AD. The furnaces are similar in size and shape to those excavated by Shimada and Epstein at Cerro Huaringa, which is only 15 km away; the smelting process that we reconstruct differs in some significant respects. At Cerro Huaringa, copper prills were trapped in a pasty slag, which was crushed on giant grindstones (batanes) to recover the metal. At 256AO1, fluid slags separated cleanly from copper, and there are no batanes. The ore smelted was weathered chalcopyrite (CuFeS_2) and furnace atmospheres were evidently very reducing, as at least some of the copper was contaminated with metallic iron. This was removed by refining the metal on shallow ceramic plates, about 20 cm in diameter, under a more oxidizing atmosphere. The copper metal contains 1–5% arsenic, but we are unable to determine whether arsenic minerals were part of the copper ore, or whether they were deliberately added.

Kilpatrick, James (University of Toronto)

[191] *Weber Fractions, Standardization, and Variation in Artifact Form*

Scholars have debated the relevance of variation and standardization in artifact assemblages since the nineteenth century. Variation in artifact assemblages is used for developing typologies and examining temporal changes in artifact form. Standardization in artifact shape is an important indicator of the cognition of early humans, socioeconomic organization, and the emergence of craft specialization. Research into the causal factors of variation includes testing humans' sensory perceptions, biomechanical studies of our motor skills, and experimental replication. These studies suggest there is a physiological threshold beyond which humans are unable to perceive size differences below 3%. The current proposal is based on an

experiment that quantified humans' ability to perceive minute size differences in three-dimensional (3D) objects without the aid of an external scale. A hand ax and a Levallois core were laser scanned and 3D printed as a size-scaled series decreasing by 1%. Size ratio tests were administered to 30 participants using the printed models. The experiment demonstrated that humans' ability to perceive size variation decreases rapidly below 3% volumetric difference between objects. The results suggest that humans' inability to accurately detect minute size differences may explain some of the variation in artifact form introduced into the archaeological record.

Kim, Alexander (Harvard University, Dept. of Anthropology), Alexander Kozintsev (Peter the Great Museum of Anthropology and Ethnogr), Nadin Rohland (Dept. of Genetics, Harvard Medical School), Swapan Mallick (Dept. of Genetics, Harvard Medical School) and David Reich (Dept. of Genetics, Harvard Medical School; Howard)

[92] *The Ones Who Stayed Behind? Genome-Wide Affinities of Okunev Remains from Bronze Age South Siberia and the Enduring Dialogue of Ancient DNA and Physical Anthropology*

Genome-wide ancient DNA data from Upper Paleolithic Siberians and deep time series in Europe challenge many traditional models of relationships between Native Americans, West Eurasians, and East Asians—commonplace units in physical anthropology—by recasting them as fusions of prehistoric ancestry streams that may unexpectedly cross-cut or fracture these categories. We evaluate new and published genome-wide data from remains attributed to Okunev—an archaeological culture of the Middle Yenisei and eastern steppe in southern Siberia (latter third–first half second millennium BC), famous for slab graves, massive stelae, and fantastic zoomorphic and anthropomorphic petroglyphs—to test an unusual physical anthropological hypothesis. Russian anthropologists have argued Okunev remains to exhibit pronounced affinity to Native Americans, surpassing that of other ancient groups from the region as well as recent Siberians and Central Asians. Kozintsev et al. (1999), in the most systematic investigation, suggested Okunev people to derive much of their ancestry from late-persisting “collateral relatives” of Native Americans who remained in Eurasia. We evaluate this proposal in special light of the “Ancient North Eurasian” concept (sensu Lazaridis 2014) and offer considerations on the future of skeletal morphology in framing and motivating investigations of human population history.

Kim, Ha Beom (University of Oregon) and Gyoung-Ah Lee (University of Oregon)

[325] *Preliminary Spatial Analysis of the Middle Mumun Culture's Land-Use Pattern in Southcentral Region of Korea*

This study investigates the land-use pattern of the Middle Mumun culture (c. 29/2800–2400 cal. BP) in south-central region of Korea from a spatial analytic perspective. By employing inter-settlement visibility analysis and geographical variable comparisons, this study explores social and environmental contexts affecting cultural decisions of the Middle Mumun people for their settlement locations. Through our analysis, we find that relationships across the Middle Mumun settlements may have emerged gradually over time through interactions among neighboring groups, and that the locations of these settlements reflect landscape preferences of the Middle Mumun people. We suggest a long-term bottom-up processes of emerging social unity as an important concept to better understand the complex context of Middle Mumun settlement choices.

Kim, Ha Beom [24] see Bone, Christopher

Kim, Nam (University of Wisconsin-Madison)

[20] *The Co Loa Settlement: Biography of an Anomalous Place*

In the archaeological study of ancient large-scale settlements, there is considerable debate regarding definitional criteria for categories of “city” and “urban.” New field studies from different world areas have enriched our understanding of the variability of past settlement configurations along dimensions of utility, meaning, space, scale, and demography. In northern Vietnam, the remains of monumental constructions of the prehistoric settlement of Co Loa still stand today. Dating to the first millennium BCE and encompassing some 600 hectares in size, this settlement was unprecedented in Southeast Asia. Recent field investigations have provided new insights for this large-scale and relatively anomalous settlement, one exhibiting signs of highly centralized political power and a dispersed, low-density form of ancient large-scale settlement. This paper offers an overview of the settlement, illustrating several local-historical and regional trends in order to provide a context for the early story of Co Loa and its occurrence. The case offers a glimpse into alternative pathways for trajectories of settlement development, both in Southeast Asia and worldwide.

[76] *Discussant*

[20] *Chair*

Kim, Nanny (Heidelberg University)

[333] *Mapping Mining Remains in the Borderlands of Southwest China*

About 43 very important silver mines and some six copper mines are known to have been worked between the early fifteenth and the mid-nineteenth century across the Far Southwest of China and in the borderlands beyond. Written sources on mining in the Ming and Qing periods are so scarce that in some cases we identified sites before eventually finding their historical names. Under ideal research conditions, this paper would present archaeological surveys on these sites. In the real world of greatly improved transportation and quickly changing landscapes, we attempt to cover as many of the sites as possible in very preliminary fieldwork surveys. In these, we try to collect spatial information on slag dumps, settlements, and temple sites, presenting finds and an approach that uses geographic information systems for analyzing spatial data. The mapping of settlements, mining areas, slag dumps, and transport networks provides a tool for integrating various data for a comparative grading of mining sites, and for gaining insights into past societies.

Kimball, Larry (Appalachian State University)

[264] *The Recognition of Hafting Traces on Native American Stone Tools*

As Keeley (1982) pointed out some time ago, the recognition of microwear traces due to hafting is an important source of information not only about how stone tools were prepared for use, but how their differential discard affects the recognition of site structure and site function. This is because the economy of different hafting arrangements and the act of “retooling” is different for hafted versus unhafted tools. In an effort to consider the variable range of hafting traces among Native American lithic technologies, a sample of over 2300 tools from Paleoamerican through Historic Cherokee industries from 40 sites in eastern North America is discussed to provide a better understand of the patterning of hafting traces. In rank order, general tool groups exhibit a variable but expected pattern of percentage of hafting traces: arrowpoints (86%), bladelets (76%), end scrapers (74%), Paleoamerican points (70%), blades (66%), Archaic and Woodland points (57%), utilized flakes (57%), retouched flakes (52%), flake tools (30–50%), drills (46%), bipolar flakes (22%), and bipolar cores or pieces esquillees (0%). It is argued that such microwear data from archaeological specimens is a useful first step to address the question of hafting, but also to guide future experimentation.

Kime, Sherry [394] see Guilfoyle, David

King, Adam [5] see Powis, Terry

King, Charlotte (University of Otago), Siân Halcrow (Department of Anatomy, University of Otago), Andrew Millard (Department of Archaeology, Durham University), Anne Marie Sohler-Snoddy (Department of Anatomy, University of Otago) and Vivien Standen (Departamento de Antropología, Universidad de Tarap)

[30] *Children of the Atacama Desert: The Complex Interactions between Breastfeeding, Weaning and Environmental Stress in One of the World's Harshest Environments.*

Infant feeding practices and the weaning process have important implications for early life health and mortality patterns. In particular, the concept of weaning stress is often invoked as an explanation for increased infant or child mortality and morbidity. In this paper we evaluate the concept of weaning stress and the bioarchaeological methods used to interpret its presence. We highlight the intimate connection between stress and the weaning process in our own research in the northern Atacama Desert, northern Chile, by combining paleopathological and incremental isotopic methods. We use a case study from the Formative Period (1400 BC–500 AD) to illustrate the interaction between breastfeeding, weaning, physiological stress and metabolic disease. This highlights the importance of taking a multifaceted approach to weaning studies, and the contribution that this type of approach can make to understanding early life histories within past natural and social environments.

King, Eleanor (Howard University), Michael Brennan (Ocean Exploration Trust), Beverly Chiarulli (emeritus, Indiana University of Pennsylvania), Christine Taylor (Maax Na Archaeology Project) and Darcie Flanigan (Maax Na Archaeology Project)

[83] *Putting the Pieces Together: Maax Na in Its Regional Context*

Twenty years of research at the large prehispanic Maya site of Maax Na in northwestern Belize have yielded insights not only into site organization and function, but also into its role in the Three Rivers Region. Ongoing investigations of a marketplace and of local caves indicate that Maax Na, while probably not the political capital that its neighbor La Milpa was, nonetheless had a distinct and important regional function as a religious and marketing center. Investigation of water management and agricultural areas further illuminate its role and add to the range of practices documented for the region. To complement this site-centric research, we have also pursued broader inquiries that link Maax Na with other communities. These include investigations into the small, agriculturally specialized site of Bolsa Verde, midway between Maax Na and Dos Hombres, and chemical sourcing of limestone monuments at Maax Na and other sites, to understand patterns of procurement and distribution. The picture emerging from this research is of a complex region, where sites of all sizes played distinctive and interconnected roles. It challenges common models of Maya polities, where one large site dominates in every aspect, and invites us to consider alternative views of regional dynamics.

King, Stacie (Indiana University), Shanti Morell-Hart (McMaster University) and Elizabeth Konwest (Indiana University)

[137] *Sacred Worlds and Pragmatic Science in the Aftermath of Conquest: The Hidden Caves of Cerro del Convento*

In the sixteenth century, Dominican priests attempted to eradicate various non-Catholic ritual practices in Nejapa. Native peoples apparently regularly visited Cerro del Convento, a Sierra Sur landmark, to perform rituals and leave offerings. In the late 1500s, priests from the Dominican doctrina in Nexapa visited Cerro del Convento to destroy and burn all evidence of "idolatry." Between 2009 and 2013, members of the Proyecto Arqueológico Nejapa Tavela surveyed and excavated at Cerro del Convento to document the occupation and use of the site. Our work shows that the rockshelters associated with Cerro del Convento were visited as early as the Late Formative (500 BC). The mesa top served as a residential and ceremonial center during the Classic and Postclassic period, a time of increased conflict and military incursion. During the Late Postclassic and Early Colonial periods, the caves and rockshelters became pilgrimage destinations and were used for storing of agricultural products. We argue that the Dominican efforts to eradicate idolatry may have had a more pernicious function of exposing hidden reserves of foodstuffs. Cerro del Convento remained an important regional landmark precisely because it met both the sacred and pragmatic needs of indigenous peoples during the turbulent years of conquest.

King, Adam (SC Institute of Archaeology and Anthropology), Terry Powis (Kennesaw State University), Kong Cheong (American University) and Nilesh Gaikwad (University of California at Davis)

[173] *Absorbed Residue Evidence of Datura Use in Mississippian Contexts*

We recently identified residues indicative of the preparation of Datura in ceramic and shell vessels dating to the Mississippian period (900–1600 CE) of the southeastern United States in the collections of the Gilcrease Museum. Datura is a genus of flowering plants whose seeds and flowers contain tropane alkaloids that produce hallucinogenic effects when consumed by people. The use of Datura for a variety of medicinal ritual practices is well established among Native Americans today and in the recent past. The only other evidence for its use in North American prehistory comes from the recovery of charred seeds, a rare occurrence in the archaeological record. Absorbed residues present an opportunity to learn more about Datura use in the past and connect recent medicine traditions. In this paper we will use archaeological and iconographic information to explore ancient contexts of use and possible transmission as part of cultic institutions.

King, Jason (Center for American Archeology) and Jane E. Buikstra (Arizona State University)

[241] *Sculpting, Renewal, and Perdurance of Illinois Hopewell Mounds*

Investigations of Illinois Valley Middle Woodland (Hopewell, ca 50 cal BC–cal AD 400) mound structure have traditionally emphasized the organization and composition of initial, or primary, features that anchor these monuments. Particular attention has been placed upon the distinctive ramp and tomb complex that centers initial ritual activity at mound sites and its connection to mortuary activity, cosmology, and creation. In contrast, archaeologists have typically underappreciated subsequent building episodes that transform tumuli into massive monuments. Often referred to simply as "capping layers" because they obstruct access to central features, these earthen additions transform and sculpt the external structure of mounds in meaningful ways that reconfigure Middle Woodland people's landscape through repetitive performances that reinforced received and transmitted wisdom. In this paper, we focus on the communal and regenerative nature of mound sculpting, particularly the reconfiguration of structures that shift activity and attention away from mortuary contexts and creation narratives to practices that emphasize renewal and perdurance throughout the Middle Woodland period and beyond.

[241] *Chair*

King, Julia

[315] *Discussant*

Kintigh, Keith (Arizona State University), Katherine Spielmann (Arizona State University), K. Selçuk Candan (Arizona State University), Adam Brin (Arizona State University) and James DeVos (Arizona State University)

[227] *Data Integration in the Service of Synthetic Research*

Addressing archaeology's most compelling substantive challenges requires synthetic research that exploits the large and rapidly expanding corpus of systematically collected archaeological data. That, in turn, demands an integration procedure that preserves the semantics of the data when combining datasets collected by multiple investigators who employ different systematics in their recording. To that end, we have developed a general procedure that we call query-directed, on-the-fly data integration that is deployed within the tDAR (the Digital Archaeological Record) digital repository. The integration procedure employs ontologies that are mapped to the original datasets. Integration of the ontology-based dataset representations is done at the time the query is executed, based on the specific content of the query. In this way, the original data recording is preserved and data are aggregated only to the extent necessary to obtain semantic comparability. Our presentation draws examples from the largest application to date: an effort by a research community of southwest United States faunal analysts. Using 24 ontologies developed to cover a broad range of observed faunal variables, we can now integrate faunal data from 37 projects investigating the late prehistoric northern Southwest, including more than 378,000 individually recorded specimens.

Kintigh, Keith [129] see Strawhacker, Colleen

Kinzig, Ann [129] see Strawhacker, Colleen

Kirakosian, Katie V. (Kaplan University)

[340] *On Manitou and Consanguineal Respect between Human and Animal Societies in Southern New England*

By definition, hunter-gatherer societies rely upon few, if any, domesticated animals. Domestication is counter to many hunter-gatherer worldviews, where human and nonhuman animals are seen as sharing a literal biological connection. From here, in essence, domestication is akin to slavery. Examples from the ethnohistoric and archaeological records will be used to illustrate how local Native groups in southern New England treated wild and domestic animals and animal remains in culturally prescribed ways, which pushes against the notion that animals should be placed in such a dichotomy in this context. Counter to the idea that humans are "rulers" over the animal kingdom, the Woodland Indian concept of manitou shows how animals, in fact, also controlled humans in very real ways.

[363] *Moderator*

[239] *Discussant*

Kirch, Patrick (Univ. California Berkeley)

[380] *Fishponds and Aquaculture in the Ancient Hawaiian Political Economy*

The political economy of ancient Hawai'i, prior to European contact in 1778–1779, has often been characterized as based primarily on a "staple economy" with highly intensified forms of both irrigated and dryland agriculture. Less appreciated is the role of intensive aquaculture of two species (milkfish and mullet) using several kinds of often extensive fishponds. This paper explores the role and significance of such aquaculture in the late precontact Hawaiian political economy, drawing especially upon extensive archaeological and ethnohistoric data from the island of Moloka'i. It is argued that on Moloka'i, fishponds rivaled pondfield irrigation in their ability to provide the elite ruling class with a dependable source of surplus.

[32] *Discussant*

Kirk, Scott

[346] *The Study of Castles throughout Europe: Limitations of Multiregional Studies*

For much of Europe, castles represent a point of cultural heritage and national pride. Yet, even though the study of castles has long been of interest to scholars, few researchers have moved beyond intraregional analyses to examine interregional trends in the manifestation of these monuments. Traditional archaeological investigations examining cross-cultural differences have been hampered primarily by language barriers and differences in how researchers approach questions pertaining to the encastellation of medieval Europe. The rising use of satellite data and GIS software in archaeological research might represent one such way to get around these barriers. This paper will focus on the potential benefits of large-scale, geospatial investigations of castles, provide an example of an analytical framework from which appropriate research questions can be asked, and examine three disparate regions—Sicily, Bohemia, and Scotland—to look at the geospatial similarities and differences between castles in each of them. It will then conclude with a look at some of the difficulties in taking such a multiregional approach in terms of computational space needed, differences between datasets between regions, and the problem of using present landscapes as a proxy for medieval ones.

[346] *Chair*

Kirkwood, Damian (University of Wyoming)

[142] *Butchering Practices at the Vore Buffalo Jump (48CK302): Investigating Organization with the Nearest Neighbor Test*

Spatial recognition of organization at mass kill sites is often commented on in the literature but is rarely systematically investigated. The goal of this paper is to investigate social organization of butchery with the nearest neighbor test. The lack of these sorts of methods in the literature is primarily due to the ever-changing methods of archaeological excavation and limited ability to easily analyze provenience data. In the literature, observations of organization and spatial patterning have relied on site maps of excavation blocks and in-field observations. In this paper, statistical methods are applied to a mass kill site of Bison bison from the Vore Buffalo Jump (48CK302) to investigate the organization of butchery. Using a nearest neighbor test, pairwise bootstrapping tests, and a chi-square analysis, this study finds that these methods can give insight into dense stratified bone beds and locate patterns more confidently.

Kiss, Viktória [196] see Szigeti, Anna

Kissel, Marc (University of Notre Dame) and Agustin Fuentes (University of Notre Dame)

[191] *Semiosis in the Pleistocene Scene*

One of the distinctive aspects of human behavior is the ability to think symbolically. However, the ability to track this capacity archaeologically is complicated by debates on what makes an object symbolic. Rather than initially asking if materials are symbols/symbolic, we offer that it may be better to ask if and how they are signs. A more nuanced view of "symbol" in the archaeological record, combined with aspects of Peircean semiotics, can help to bridge the gap between the material record of the past and current interpretive assessments. We argue that using the Peircean distinction between qualisigns, sinsigns, and legisigns provides support for this endeavor. The glimmers of early symbolic behavior (the sporadic occurrences of objects with embedded social meanings in the early/middle Pleistocene) can best be seen as sinsigns, "one-off" occurrences, whereas sites that show long-term presence of such materials are demonstrating the presence of legisigns, the codification of ideas. To illustrate this approach we apply these ideas to

three classes of artifacts (ochre, engraved objects, and ornamentations), showing how this system can address issues of relevance to archaeologists who often fetishize the symbolic and think that is what makes us human. Communication, and meaning, are more than symbolic.

[269] *Discussant*

Kitchel, Nathaniel (University of Wyoming)

[216] *The Use and Travels of Red Munsungun Chert: The Early Social Significance of a Northern New England Quarry*
Red Munsungun chert from northern Maine has long been recognized as an important lithic raw material during the fluted point period of New England. Building upon this observation, recent lithic sourcing efforts using visual and XRF geochemical techniques, have demonstrated that this material is virtually ubiquitous in fluted point sites from the region. This same study also shows that red Munsungun chert is transported over longer distances than other raw materials commonly used at this time. Such patterns of use suggest that red Munsungun chert was more highly prized than other toolstone sources commonly used by the earliest peoples of this region. Such differences indicate that this toolstone, and consequently the quarry location from which it was obtained, held social significance for these first groups beyond simple utilitarian applications. These patterns demonstrate that these early populations were already highly knowledgeable of their environment having embedded landscape features, including the quarry location of red Munsungun chert, within webs of social meaning.

Kitchell, Lindsey (Indiana University) and Alex E. Badillo (Indiana University)

[137] *The Sierra Sur in 3D: Benefits of Photogrammetry and 3D Printing for Archaeological Research in Remote Regions*
Researchers working in the Sierra Sur region of Oaxaca, Mexico are often documenting sites that have not yet been studied by western scholars. 3D modeling (via photogrammetry) and 3D printing is a quick and low cost way we can begin sharing this new information with other scholars and the public, while simultaneously enhancing the documentation of archaeological landscapes and artifacts. In the 2016 field season of Proyecto Arqueológico de Quiechapa (PAQuie), we pilot tested the use of low cost photogrammetry and 3D printing at several scales of analysis. In this paper, I will present the benefits of adding photogrammetry and 3D printing to field research. In particular, I will discuss using (1) UAV (drone) photography to create 3D models of sites and landscapes, (2) still photos to create 3D models of artifacts, rock carvings, and landscape features, and (3) the merits of having 3D prints of those models. These methods are particularly conducive to fast and easy sharing of information; facilitating collaboration and communication between scholars working in this region and beyond.

Klassen, Sarah (Arizona State University), Jonathan Weed (Massachusetts Institute of Technology) and Damian Evans (École française d'Extrême-Orient)

[333] *Untangling the Urban Morphology of Medieval Angkor, Cambodia*
One of the largest puzzles for archaeologists at Angkor is untangling the extremely complex chronological development of the site. The region was host to hundreds of years of urban occupation arising out of a long tradition of habitation through the Bronze and Iron Age. Decades of archaeological investigations have established relational frameworks through which it is now possible to do more precise dating. Recent lidar investigations and the associated mapping and ground truthing have documented over 1,400 temples and 8,000 reservoirs. In this paper, we group temples with associated reservoirs based on alignments, proximity, and known historical relationships. We then combine several disparate datasets into a relational database and use a mathematical model to understand chronological and spatial relationships. The resulting maps reveal the urban development of Angkor and highlight spatial patterns of anthropological interest. We argue that having a more sophisticated understanding of the development of Angkor can assist in asking more robust questions of the archaeological site.

Klassen, Sarah [23] see Russell, Will

Klaus, Haagen D. [233] see Schaefer, Benjamin

Klehm, Carla (Washington University—St. Louis)

[379] *Material Elaboration and Monumentality: Mortuary Beads, Pastoralists, and Social Innovation in Northwest Kenya*
Megalithic architecture appeared suddenly in northwest Kenya 5,000 years ago in tandem with the earliest pastoralists in the region. As Lake Turkana's levels dropped, these people built "pillar sites"—massive feats of labor and coordination that represent one of the earliest instances of monumentality in Africa—in a brief explosion of material and architectural elaboration. The burials associated with these pillar sites are highly ornamented, with thousands of beads made from stone, bone, and ostrich eggshell that would have been brilliantly colored when worn. This paper takes a first look at sourcing, mineralogy, and the context of these bead assemblages, excavated by the Later Prehistory of West Turkana Project, as an entry into understanding the radical reconceptualization of self and society that took place. During this era of climate instability and economic innovation, people felt compelled to procure a wide variety of minerals, gather them together, and place them with their dead, suggesting novel approaches to the ways they understood the worlds of the living and the afterlife. These beads in turn provide insight at the level of individual perception into how people grappled with social changes and, potentially, differentiation in early complex societies.

Klein, Cecelia

[80] *Blindfolds and the Eternal Return in Late Postclassic Central Mexico*
Scholars have invariably interpreted the blindfolds worn by certain figures in Aztec painted manuscripts as a sign of—in their words—"transgression," "sin," and "punishment." This talk challenges the simplicity and inherent Eurocentrism of that reading. It is true that the Aztecs perceived a person's mistakes to plunge him into darkness and chaos, and that blindfolds, at one level, symbolized that disorder. The cause of a moral error, however, was embodied by certain objects and substances that also contained the power to cure the damage caused—and thus to restore order and wholeness to the social fabric. For the Aztecs the blindfold enabled this reversal. It did so, I argue, because, by blocking vision and light, it symbolically returned the wearer to the primordial darkness of the earliest years of the Creation when, sources tell us, "it had always been night." Blindfolds allowed their wearer to tap into the creative energy of this darkness, thereby undoing the damage caused. This new understanding of blindfolds as having ambivalent meaning for the Aztecs therefore resonates with Mircea Eliade's concept of the "Eternal Return," in which people the world over symbolically return to the distant past in order to restart the present.

Klemmer, Amy (University of Wisconsin—Milwaukee)

[232] *Preliminary Faunal Analysis at the Coastal Site of Rio Chico, Ecuador (OMJPLP-170)*
The Rio Chico site is situated on the central coast of Ecuador, a region that is heavily influenced by climatic events such as El Niño Southern Oscillation (ENSO). Rio Chico was occupied almost continuously for 5,000 years (ca. 3500 BCE to 1532 CE), and therefore provides an opportunity to study

coastal resource usage over a long temporal span. This poster presents a preliminary zooarchaeological analysis of the relative abundance of fish and other classes of fauna at the site. A sample of faunal remains from the Florida Atlantic University field school excavations conducted in 1997, 1998, 1999 and 2003 is identified to the class level and serves as the basis of this analysis. This analysis provides a foundation for further research to ascertain if there was relative stability or change in resource usage at Rio Chico over time. Prehistoric data analyses from coastal regions impacted by catastrophic weather patterns related to ENSO are relevant to the modern-day management and sustainability of coastal fisheries. A better understanding of resource usage at sites such as Rio Chico can provide important knowledge of the ways in which humans living in coastal regions may have responded to environmental instability over time.

Klimowicz, Janis [140] see Haynes, Gary

Klokler, Daniela (Universidade Federal de Sergipe—UFS) and Todd Pitezel (Arizona State Museum/University of Arizona)

[84] *From Southern Brazil and Northwest Mexico: Swimming across Landscapes with the Fishes*

Prehistoric societies included multidimensional natural, economic, social, political, and ritual landscapes. In this paper we briefly describe landscapes from the southwestern coast of Brazil during the Archaic period and from the Casas Grandes Medio period (AD 1200–1450) in northwest Chihuahua, Mexico. More specifically, we address ritual landscapes from shell mounds to hilltops. These components of landscapes are highlighted in honor of research conducted by Paul Fish and Suzanne Fish that inspired our work.

Kloulehad, Errolflyn [394] see Ngirmang, Sunny

Knaf, Alice [133] see Ostapkowicz, Joanna

Knecht, Rick [144] see Hillerdal, Charlotta

Knell, Edward (California State University, Fullerton)

[184] *Terminal Pleistocene–Early Holocene Occupation Span and Technological Provisioning Strategies at Pluvial Lake Mojave, California*

This paper represents a first attempt to reconstruct the occupation span of Terminal Pleistocene–Early Holocene foragers around pluvial Lake Mojave, Mojave Desert, California. Models suggest and research indicates that foragers were more sedentary and made shorter moves around large, productive resource patches (large lakes, marshes), but made more frequent and longer distance moves when resource patches were small and/or widely scattered. Lake Mojave at its Pleistocene maximum was 300 km² and reasonably considered a large resource patch; whether foragers used it this way is unknown, though. To address this, I consider (following the lead of other researchers) whether the lithic technology at Lake Mojave fits a provisioning place or provisioning individual strategy. The provisioning place strategy is expected when occupation span is long and the provisioning individual strategy when the occupation span is short. Given Lake Mojave's large size and expected patch productivity, the provisioning place strategy is anticipated. Several variables will be used to differentiate between these strategies: toolstone selection and proximity, tool kit structure (degree of curation) and diversity, and artifact replacement patterns. Data to address these issues come from analyses of the extant Campbell and Brainerd collections, and my ongoing research along the shorelines of Lake Mojave.

[184] *Chair*

Knight, Charles (University of Vermont)

[42] *Quantifying Obsidian Extraction at the Zaragoza-Oyameles Source Area of Puebla, Mexico and What This Means for Understanding Ancient Mesoamerican Economies*

Typically overlooked in economic models of commodity production, distribution and consumption in Mesoamerica, is some discussion on the initial procurement of the materials that form the basis of the ancient economies we study. Significant cultural issues, such as labor coordination, territoriality, group identity, knowledge transmission and wealth, which are all wrapped up in a dynamic political and ideological milieu, are at play in the discrete geographical loci where material procurement occurs. Focusing on the procurement of obsidian at the Zaragoza-Oyameles source area in eastern Puebla, Mexico, I present quantitative data on the extent of raw material extraction and, where possible, the type and degree of early stage tool production at the source. Results of detailed topographic mapping of these extraction loci, and the analysis of intensive collections made from their surface, provide a fundamental baseline of data for all subsequent discussions on the role of obsidian in ancient Mesoamerican economies.

[42] *Chair*

Knight, Terry [366] see Hammer, Ben

Knight, Vernon J., Jr. [365] see Smith, Karen

Knipper, Corina [90] see Harris, Susan

Knisley, Matthew (University of Chicago)

[242] *Deep Time versus Archaeological Time: Disentangling Stratigraphy, Periodization, and Historical Narrative*

The earth sciences have periodically contributed to shifts in archaeologists' theoretical and methodological approaches to space and time ("deep" time and sociocultural evolution, stratigraphic laws and contextual interpretation). The Anthropocene seems to herald another such shift, but the category/concept remains controversial given its bridging, by design, of science and politics. This paper argues that archaeologists can clarify our discipline's engagement with these debates by comparing archaeological and geological periodization. An assessment of differing approaches to sedimentary layers reveals conflicting disciplinary logics concerning evidence and historical narrative. These differences extend beyond scaling individual disciplines "up" or "down" through space and time, or how to incorporate nontraditional lines of evidence into the existing interpretive frameworks of particular disciplines. This paper points to a number of conceptual matters that must be addressed as part of a possible disciplinary reordering in response to the challenges of global warming and other environmental crises.

Knodell, Alex**[118]** *A Paradigm Shift in Regional Archaeology?*

The pace and scale of technological change in field- and lab-based applications in remote sensing, spatial sciences, and digital media (to name only a few) have fundamentally transformed archaeological research design and practice, especially on a regional level. But have these technological advances changed the discipline in ways that might constitute a paradigm shift? Have they resulted in new disciplinary priorities? Or do they simply represent newer, faster ways to pursue agendas not so different than before? This paper examines positive and negative examples of what may constitute a paradigm shift in regional archaeology and what implications that may have. The first case concerns remote sensing and spatial technologies. The second has to do with digital media. A critical examination from the perspective of scientific revolutions suggests that new priorities have emerged in direct response to certain technological opportunities, especially since the 1990s. It is more difficult to assess our current state in the twenty-first century—although seemingly characterized by exponential growth in everything “digital,” few would argue that in every case this represents some unqualified good. A further challenge is that disciplinary change tends to be apparent mostly in hindsight. Nevertheless, such field-shaping developments call for careful scrutiny.

Knoll, Michelle**[363]** *Discussant*

Knudsen, Pauline [144] see Walls, Matthew

Knudson, Kelly [8] see Pacheco-Fores, Sofia

Knüsel, Christopher (UMR 5199, PACEA, Université de Bordeaux, France)**[31]** *“Where Individuals Are Nameless and Unknown”: Osteobiography Reveals the “Big Man,” the Ritualist, the Heiress, and the Priest*

In 1957, Christopher Hawkes (of the ladder of inference renown) wrote: “the most scientific and therefore the best, because the purest, kind of archaeology is the prehistoric kind, where individuals are nameless and unknown, and so cannot disturb our studies by throwing any of their proud and angry dust in our eyes” (quoted in Christopher Evans, *Historicism, Chronology and Straw Men: Situating Hawkes’ “Ladder of Inference,”* *Antiquity* 72[276]:398–404). Because the social identity of the deceased cannot be identified from human remains without analysis, osteobiography, the bioarchaeological reconstruction of the lives and deaths of individuals from the past, is essential. This is as true for historic as for prehistoric people, not only for those “without history,” but even those named individuals who are said to be “historical.” This contribution introduces a Bronze Age “Big Man,” an Iron Age ritualist, a medieval aristocratic heiress, and an Archbishop of Canterbury (and martyr), a mix of the historic and prehistoric, all nameless without analysis and none throwing much dust in our eyes.

Ko, Jada [116] see Brunson, Katherine

Ko, Jae Won (Jeju Cultural Heritage Institute)**[24]** *Peopling of Jeju in the Late Pleistocene and Early Holocene*

Paleolithic sites in Jeju Island have been found in the Quaternary sediment layers that are related to volcanic activities. Accordingly, research has been closely related to the geological investigation on sediment formation and volcanic activities. This presentation focuses on two Paleolithic sites, Oedodong along the north coast and Sangsugae cave along the south coast. The Oedodong site contains choppers and is dated to 32,000 BP; the Sangsugae cave site represents the Terminal Pleistocene, which dates to 25,000 BP. This study investigates the relationship between the Terminal Pleistocene Paleolithic culture and the Early Holocene Neolithic culture, known as the Gosanri culture.

Kobayashi, Masaru**[211]** *Archaeology of Salmon Ceremony in the Japan Sea Coastal Regions: A Comparative Study with the Northwest Coast of North America*

As in the Northwest Coast of North America, salmon may have played a critical role for the development of subsistence and political economies as well as ritual systems during prehistoric and historic northern Japan. This paper explores the Jomon salmon ceremony in the Japan Sea coastal regions based on the analyses of the (1) ecology of salmon, (2) rock arts (petroglyphs), (3) salmon remains and their archaeological contexts, (4) zoomorphic stone figurines (clubs), and (5) ethnohistory (folklore) of salmon rituals and their spatial distribution. All of the evidence from the analyses suggests that ecological conditions of salmon have a significant effect on Jomon salmon ceremony in the Japan Sea coastal regions.

[148] *Discussant*

Kober, Brent [335] see Craig, Douglas

Kocer, Jacqueline**[59]** *Why Fake it? Counterfeits, Emulation, and Mimicry: Symbolic and Practical Motives for the Imitation of Crafts*

I examine the behavior of emulation wherein an artisan reproduces a craft on a less valuable or precious material to mimic a desired symbolic prestige good. I present cross-cultural examples of artisans making copies of a craft using different materials. Under what circumstances do people create counterfeit objects? Examples from the Gallina area (AD 1100–1300) of the American Southwest are discussed. The Gallina occupied an area on the periphery of a more socially complex polity (Chaco), and they appear to have lacked access to the prestige goods that they were counterfeiting. I further discuss symbols of prestige and how they might be used by the emulating group.

[59] *Chair***Koenig, Charles W. (Texas State University–San Marcos, Texas)****[126]** *Low Impact, High Resolution: Unraveling and Learning from 10,000 Years of Hunter-Gatherer Use of Eagle Cave*

On the northeast fringe of the Chihuahuan Desert, one of the largest rockshelters in the Lower Pecos Canyonlands, Eagle Cave, preserves an extraordinary record of hunter-gatherer life spanning more than 10,000 years. Ongoing investigations by the Ancient Southwest Texas Project of Texas State University beginning winter of 2015 have re-excavated a 4 m deep trench through the center of this massive rockshelter in order to document and sample complex stratigraphy and to stabilize and backfill archaeological units left open in 1963. Spanning 13 field months, we have used continuous Structure from Motion 3D mapping as our primary documentation method while employing microstratigraphic excavation techniques and rigorous

multidisciplinary sampling led by geoarchaeology to explore Archaic and Late Prehistoric features such as shallow pits, earth oven beds, and latrines. We have also sampled Paleoindian deposits containing surface hearths, butchered bison bone, decomposing fiber beds, and mammoth remains. This presentation summarizes our methodological approach and field interpretations and highlights the site restoration effort as well as ongoing analyses from the 2015–2017 Eagle Cave investigations.

[126] Chair

Koenig, Charles W. [21] see Black, Stephen L.

Koerner, Shannon (Colorado State University, CEMML), Bretton Giles (Colorado State University, CEMML) and Eric Skov (Colorado State University, CEMML)

[344] *Landscape Preference and Precontact Site Location Modeling in the Central Plains, USA*

The Cultural Resource program at Fort Riley provides an ideal setting for developing and testing models for precontact settlement within the Flint Hills region of the Central Plains. Precontact populations utilized the patchy environmental resources available within the Flint Hills by means of specialized activity locations in varying topographic zones. Many of these small sites have been identified through extensive pedestrian surveys of the Fort Riley Installation. These survey data have been used to test existing site location models in addition to providing more information about the different resource exploitation strategies of precontact peoples in the region. This broad view of the survey data has both refined and developed new research questions about landscape use within Fort Riley, particularly in regard to the National Register of Historic Places (NRHP) evaluation process.

Koerner, Shannon [376] see Giles, Bretton

Koetje, Todd (Western Washington University)

[90] *Neanderthals, Denisovians, and Modern Humans: What Material Culture Differences Can We See During Their Overlap?*

The time frame from 50–30 kya contains evidence for at least three distinct human populations spread across northern and western Eurasia. These groups faced serious environmental challenges, and seem to have existed in widely spread, small populations with perhaps very similar basic cultural adaptations. As indicated by shared genes, these groups were evidently in contact. How are these populations represented in material culture? To what extent can we begin to see typological and technological patterns in material culture that might distinguish them? Preliminary comparisons suggest only very subtle distinctions. Is this the Bordes-Binford debate's revenge?

Kohler, Tim (WSU/SFI/CCAC)

[38] Discussant

Kohler, Tim [38] see Crabtree, Stefani

Kohut, Betsy [5] see Bey, George J.

Kohut, Lauren (Tougaloo College)

[37] *Thinking Outside the Map: Alternative Approaches to Data Visualization*

One of the more promising applications of Geographic Information Systems (GIS) in archaeology is the potential to incorporate aspects of human perception and experience of the landscape. Visibility analysis has been applied extensively to archaeological contexts, and models of movement, acoustics and other sensory experiences have recently received greater consideration. But despite the promise of moving beyond measurements of geographic space, most applications of experiential modeling continue to rely on standard cartographic tools for representing and analyzing relationships between archaeological phenomena. In this paper, I explore how digital technologies offer alternative (i.e., non-map-based) visualization techniques can be used to better represent and support analysis of human-scale spatial relationships. As a case study, I use regional survey of Late Intermediate Period (1000–1450 CE) hilltop fortifications from south-central highland Andes. Specifically, I examine alternative visualization techniques for modeling intersite relationships in terms of visual perception and travel time—rather than geographic distance. This case study contributes to broader discussions of the potential for digital technology to transform both how we represent and analyze archaeological data.

Kolb, Michael (Metropolitan State University of Denver)

[346] Discussant

Kolen, Jan (Leiden University)

[158] *The First Cultural Landscapes of Europe—and Before . . .*

Cultural landscapes appear relatively late in the human history. In Europe, between c. 40–20,000 BP, people for the first time seem to have transformed (parts of) their environment intentionally on a significant spatial scale in order to make places and areas “fit” for future activities. Already between 40,000 and 30,000 BP, prominent natural formations and hidden places were marked with signs and symbols to enable distant communication. From c. 25,000 BP onward, on-site constructions, such as dwelling structures, were deliberately “built” to facilitate livelihood. By 20,000 BP, hunter-gatherers probably used fire as a landscaping tool as well. The timing of these developments makes clear that the emergence of cultural landscapes does not simply coincide with the appearance of anatomically modern humans in Europe. This paper briefly discusses the evidence for the thesis that the cultural landscape is a late development. However, it also criticizes the idea that the earliest cultural landscapes can be understood properly from conventional geographical perspectives. Thirdly, the paper explores what could have characterized human niche construction in the millennia before c. 40,000 BP. How did Late Pleistocene hunter-gatherers organize their living space if not by means of cultural landscapes in a more or less classical sense?

[158] Discussant

[158] Chair

Kollias, George (Northern Arizona University, Belize Valley Archaeological Reconnaissance Project) and Jaime Awe (Northern Arizona University, Belize Valley Archaeo)

[101] *Investigating the Maya Polity at Lower Barton Creek, Cayo, Belize*

Over fifty years of settlement research in the Belize River Valley has made the region one of the most intensively investigated areas of the Maya Lowlands. Recent lidar research by the Belize Valley Archaeological Reconnaissance Project identified the previously unknown center of Lower Barton Creek in the southern extent of the Belize Valley, filling in a major gap in our understanding of settlement histories. In this paper, we present the results of settlement survey based on spatial analysis of lidar data and the results of excavations in the Lower Barton Creek site core. The goal of this research was to contextualize the site's occupation within the ancient sociopolitical dynamics of the Belize River Valley. High-resolution AMS 14C dating and ceramic analysis indicate that Lower Barton Creek was settled by the Middle Preclassic Period (~700–300 AD cal), and quickly grew into a large regional center. A hiatus in activity at the site occurs after AD 300, coinciding with an extended drought documented in regional paleoclimate records. Ceramic evidences indicates that the site core recovers after AD 700 and continues to develop until its abandonment in the Terminal Classic Period around AD 900.

Kollmann, Dana D.

[14] *"An Arson, a Wig, and a Murder": The Search for Patricia Calloway*

Patricia Calloway was reported missing from Henderson, Kentucky, on March 3, 1993. She was last seen in the company of her brother-in-law, Gene Calloway. On October 17, 2012, arrest warrants were executed for Gene and his wife Debra for the felony counts of homicide, kidnapping, tampering with evidence, and retaliation against a participant in a legal process. Debra was convicted, but Gene died while awaiting trial. Prior to his death, Gene prepared a crudely drawn map of the body disposal location. This map was recovered from an ammunition box that had been buried outside for an unknown period of time. In May 2015, forensic archaeological resources were pooled in the effort to interpret the map and thoroughly investigate the presumed location of interment.

Kolpan, Katharine (University of Florida)

[245] *If the Dead Could Return: The Politics of World War II–Era Human Remains in Eastern Europe*

Although World War II hostilities ended in 1945, still today the graves and remains of both combatants and civilians continue to be unearthed, especially in Eastern Europe. These discoveries of graves become entwined with the dynamic physical and geopolitical landscapes, whereby the post-human remains take on new, contested identities. Their unique identifications to name or nationality are sublimated, as their collective national or ethnic identities become prioritized. Combatants tentatively identified as German are typically interred near where they fell, in foreign lands, as a gesture of reconciliation. However, the Second World War exacerbated ethnic hostilities in the former Yugoslavia. There the uncertain identification of World War II combatants allows bioarchaeological materials to take on new meaning as they become representations of continuing feelings of loss and animosity that have been manipulated for contemporary ideological purposes. The indexicality of these enduring remains keeps the memories of the war salient in current political agendas, such that the past is not really past.

[245] *Chair*

Konstantinov, Aleksander V. [332] see Terry, Karisa

Konwest, Elizabeth [137] see King, Stacie

Kooiman, Susan (Michigan State University)

[21] *Cooking and Cuisine: Culinary Clues and Contexts in the Archaeological Record*

Identifying specific foods exploited and consumed by people from past societies is important, but decisions concerning nutrition and social identity can only be fully understood through the study of food preparation techniques and recipe development and traditions. Cooking and cuisine embody the intersection of the biological and the cultural. Their centrality in both everyday and ritual life makes them ideal thoroughfares into the exploration of adaptive, social, political, and ideological tenets and behaviors of past societies. For this reason, ancient cooking techniques and the social and cultural aspects of food choice have become topics of increasing interest. There are multiple evidences through which to access past diet and cooking, including macrobotanical and faunal remains, food processing technologies, chemical and microscopic food residues found on cooking technologies, experimental replication and ethnographic analogy. Each method yields unique and complementary data about past diet and food processing. This diversity holds the potential for collaborative efforts across multiple independent methods resulting in more complete social and cultural interpretations of past cooking habits and food selection.

[21] *Chair*

Kooiman, Susan [21] see Arthur, John

Koons, Michele (Denver Museum of Nature & Science)

[382] *Climate Change and Moche Politics: A View from the Northern Chicama Valley, Peru*

In this paper I will discuss the different lines of evidence pertaining to detecting El Niño and La Niña events at the site of Licapa II and surrounding Northern Chicama Valley. Flood deposits, dune encroachments episodes, malacological data, canal destruction and rebuilding events, and radiocarbon evidence are used as proxies to help understand the intensity and timing of ENSO events. I compare evidence from Licapa II to other sites inside and outside the Chicama Valley to highlight the localized impact of ENSO events. The local nature of destruction from such events has repercussions for the way that political relationships functioned at the sub-valley, valley, and intervalley level.

[2] *Chair*

Koons, Michele [303] see Trautwein, Emily

Koontz, Rex (University of Houston)

[119] *H. B. Nicholson and the Gulf Coast*

While known primarily as an Aztec specialist, H. B. Nicholson was instrumental in beginning a dialogue on regional iconographies. A key example of this dialogue was his work on deity complexes. Building on his mastery of the ethnohistorical data, Nicholson's work on deity complexes attempted to locate particular deity groups with certain regions. This essay looks at Nicholson's hypotheses on Gulf Coast iconography and how those hypotheses have helped shape the regional iconographies now being constructed.

Koontz, Rex [179] see Turner, Andrew D.

Kopperl, Robert (Willamette Cultural Resources Associates)

[51] *Bear Creek (45KI839) Data Recovery Investigation and the Paleoarchaic Settlement of the South Salish Sea during the Late Pleistocene-Holocene Transition*

The Bear Creek site (45KI839) in Washington State's central Puget lowland is among the earliest lithic artifact-bearing, professionally excavated archaeological sites on the Pacific coast between Haida Gwaii and the Santa Barbara Channel. Data recovery excavations in 2013 provided an unprecedented view of Native American settlement in a rapidly changing coastal lowland setting during the Late Pleistocene-Holocene (LPH) transition. We summarize the results of these excavations and attendant analyses and address some broader implications of the research to date, including the settlement of the earliest peoples in western North America, patterns of land use in the Pacific Northwest's dynamic post-glacial environment, and rethinking regional culture-historical sequences. The Bear Creek LPH component contains a lithic assemblage akin to the Western Stemmed Tradition in the interior although it also shows elements of continuity with later regional technological traditions. The lithic assemblage and other contextual data meet expectations derived from models of WST settlement of the interior Pacific Northwest which originated from a Pacific coastal migration.

[51] *Chair*

Kosiba, Steve (University of Minnesota)

[29] *Does Technology Hinder or Assist Storytelling? A Critical Theory Approach to Archaeological Representation and Relational Data*

Advances in archaeological science are throwing new light on old concerns about representations of the past. Methods such as GIS allow archaeologists systematically to analyze multiple variables at once and rapidly to view data from various vantage points. Critics argue that such methods lose sight of the experiential aspects of history—the cultural differences that influenced how different people participated in social life and told stories about their past. This paper argues that this critique creates a false dichotomy between categories for archaeological explanation and practices that structure social experiences. In particular, the paper draws on critical theory and the philosophy of action to demonstrate how objective renderings of archaeological data can be consistent with subjective, experiential practices of storytelling. Stories are told by emphasizing situated relationships among people, materials, and spaces. New technology, with its capacity to create truly relational ontologies, can enhance archaeologists' abilities to tell stories in ways that mirror cultural understandings, reveal essential cultural differences, and represent complex ecologies. As an example, the paper presents photogrammetry and GIS research from the heartland of the Incas, to tell a story of how forcibly resettled workers created a political community and challenged an empire by building their houses.

[272] *Discussant*

Kosiba, Steve [331] see Hunter, Raymond

Koster, Jeremy M. [156] see Cooper, Catherine G.

Kostrzewa, Agata (Bournemouth University)

[235] *Will Your Childhood Years Kill You Earlier? A Study Exploring the Relationship Between Height, Stress, and Age at Death*

Could shorter legs mean premature death? Stature is a highly complex trait which seems to be influenced by many different factors. To name a few, genetics, social status, through to environment, diet, or health issues. However, it has been observed for some time that taller people live longer. For the purpose of current research, data from 10 multi-period sites were collected. The main focus of project is to explore the correlations between height and age-at-death. Additional to this, as it is broadly suggested that environmental factors have significant impact on body height, this research seeks to explore whether individuals that experienced stress during childhood or adolescence are more likely to be shorter and die younger? As an indicator of childhood stress, linear enamel hypoplasia was analyzed. The next question considered, are shorter people more likely to show stress markers developed in adult life? Therefore, cribra orbitalia was analyzed. All possible associations were explored, taking into account sex and origin of the individuals. Does childhood stress result in shorter body height, and is stature indeed connected to the age at death?

Kosyk, Katrina (McGill University)

[347] *Communities of Practice and Sound-Related Archaeological Collections*

This paper explores an alternative method for examining ephemeral aspects of material culture, such as sound, in the production processes of ceramic precolumbian aerophone construction. In a case study of a museum collection from the G-752Rj site in Greater Nicoya, I demonstrate that it is possible to identify groups of producers and evidence of knowledge transfer between persons that may reflect communities of practice. This research has the potential for examining regional trade and migration of sound related concepts as well as building upon our conceptions of everyday practices of past peoples.

Kotar, Kathryn (McGill University) and James M. Savelle (McGill University)

[190] *Preliminary Results of New Excavations on Jens Munk Island, Foxe Basin, Arctic Canada*

Paleo-Inuit groups settled and inhabited the Canadian Arctic from 2800 BC until the arrival of Thule Inuit groups approximately 1200 AD. Previous archaeological research indicated that Paleo-Inuit populations were particularly large and stable in a "core area" comprising Foxe Basin, Nunavut, and adjacent regions. The diverse and supposedly stable resources of this area allowed people to continuously inhabit the region for almost 3,000 years, including a supposedly smooth transition from the early (Pre-Dorset) to late (Dorset) phases of the Paleo-Inuit Period. The core area model persists in Arctic archaeology, despite recent critiques and a paucity of primary data. In summer 2016, we began new excavations at Kapuvik on Jens Munk Island to shed light on this argued continuity. The field season was part of Savelle's ongoing research project regarding the core area model, which began in 2002. Our investigations targeted dwelling features from transitional levels (i.e., late Pre-Dorset and early Dorset) to document change between the two periods; that is, whether it was in situ development or a replacement population that spurred a cultural shift. This paper will present our initial results, with a particular emphasis on the recovered faunal remains.

[190] *Chair*

Kotegawa, Hirokazu (Museo de Córdoba, Ver.)

[3] *Trono olmeca de Estero Rabón*

En el sitio arqueológico Estero Rabón, se encontró un fragmento superior de trono olmeca en 1996. Actualmente está resguardado en el pueblo que asienta encima del sitio pero también se había olvidado en la comunidad académica. A través del Proyecto Arqueológico Estero Rabón, este trono fue analizado detalladamente para reconstruir la imagen total de él, ya que actualmente se ha perdido parte inferior del trono. En el inicio de este estudio se

pensó que tenía una imagen parecida al trono de otro sitio olmeca Loma del Zapote porque la parte superior de ambos tronos tienen imagen similar. Además, en el corpus de las esculturas olmecas se encuentran varios pares de esculturas similares. Sin embargo, aunque es un resultado preliminar, hemos considerado que es un trono olmeca extra ordinario y único en el corpus de esculturas olmecas. Además de que el trono de Estero Rabón tiene una forma particular, cuando se observan tronos de distintas regiones y tiempos en Mesoamérica, se encuentran varios ejemplos similares a este trono olmeca. En este trabajo se examinará esta similitud de la forma de los tronos mesoamericano para comprender la relación interregional y la tradición continua en Mesoamérica.

Kotsoglou, Anastasia (Cornell University) and Andrew Crocker (Cornell University)

[11] *Applied Digital Technologies and GIS Spatial Statistics at Tzak Naab, Northwestern Belize*

The ceremonial center of Tzak Naab, located in the northern hinterlands of the major Maya city of La Milpa, displays many idiosyncratic and unique elements in its built environment that speak to the relationship of the site with the natural landscapes it inhabits. The site core is constructed on three large tiers which overlook the Dumbbell Bajo, a large seasonally inundated wetland. Within this area, aspects of (in)visibility are employed to control movement through—and perception of—space. We investigate these issues using various digital and GIS technologies in order to show how different platforms may be understood at scalar levels ranging from the local to the regional. We also consider the feasibility of Real Time Kinematic mapping in Central America and the ways in which underutilized mapping techniques may be combined with spatio-statistical testing that combines recent and legacy data.

Kotsoglou, Anastasia [179] see Heller, Eric

Koutlias, Lauren

[345] *Children's Health in Archaic Texas: A Paleopathological Analysis of Juvenile Remains*

While many dissertations, theses, and publications have repeatedly touted the relatively low number of juvenile burials at Texas mortuary sites, this research project serves to reconsider their importance in the archaeological record. The Archaic Period mortuary sites of Ernest Witte and Morhiss on the Western Gulf Coastal Plains of Texas have an abundance of juvenile skeletons on which to conduct an analysis. Juvenile bones are especially susceptible to extrasomatic stress where adult bones may not be affected. By studying the remains of these children from a paleopathological perspective, a connection can be made to diet, lifestyle, and overall community health. This study aims to prove that a consideration of juvenile presence and contributions in past societies is important to reconstructing and understanding the past.

Kovac, Milan [131] see Lieskovsky, Tibor

Kovacevich, Brigitte (University of Central Florida), Duncan Cook (Australian Catholic University), Michael Callaghan (University of Central Florida) and Dawn Crawford (Southern Methodist University)

[323] *The Complement of Geochemical Soil Data to Artifact Patterns in the Study of Craft Production: A Case Study from Cancuen, Guatemala*

This paper will discuss the various activities that took place on the exterior stone patio floor of the M6-12 domestic structure at Cancuen, Guatemala, and compare it to previously published findings of the M10-4 and M10-7 structures. These structures typically have a low investment in construction and appear to be nonelite in status, characterized by earthen mounds surrounded by limestone flagstone floors and perishable superstructures. These surfaces often appear to be communal activity areas where multicrafting took place. These activities included large-scale lithic production, including jade and pyrite, subsistence activities, and other types of craft production, some of which are highly visible. Geochemical ICP-MS analysis of soils can help to present a clearer and more holistic picture of the spatial patterning of these activities and the nature of economic structures that may not be readily visible to the naked eye.

Kovacik, Peter [174] see Scott Cummings, Linda

Kowalewski, Stephen (University of Georgia)

[84] *Community, Territory, and Polity in Postclassic Highland Oaxaca*

In late prehispanic Oaxaca, Mexico, the community was a territorial polity cross-culturally comparable to the city-state. Sixteenth-century native and Spanish sources describe aspects of these communities. Full-coverage archaeological surveys have mapped dozens of cases, providing information on size and internal structure not available in the documents. This study compiled evidence regarding population, territory size, boundary marking, internal complexity, political status, languages, hydrology, and agricultural practices for some 60 communities that have both full-coverage archaeological survey and documentary data. Communities (city-states) usually had less than 10,000 inhabitants; the largest had 100,000. Larger city-states were also the capitals of greater states made up of subordinate communities. Territories were small—usually less than 100 km². All had shrines or temples, many of which were located at the edges of the territory. Polities were simultaneously urban (over half the population living in large towns or cities) and had strong rural development. Communities had this same form regardless of language or predominant agricultural practice. Larger cities and the capitals of greater states were located in larger valleys. They had key positions in the Mesoamerican world-system. The similarity in form despite environmental differences echoes conclusions about Hohokam communities made by Paul and Suzanne Fish.

Koziarski, Ralph (AECOM)

[385] *Did Bears Make the Fur Trade Possible? Seasonal Resource Scheduling during Wisconsin's Early and Middle Historic Periods*

Data have been found to suggest increased consumption of bear meat at Eastern Wisconsin sites during the seventeenth and eighteenth centuries. While bear remains are rare at these sites, they occur at generally higher densities than at Late Prehistoric Late Woodland and Oneota sites in the same region. Ethnohistoric evidence, supported by zooarchaeological data from the eighteenth century Meskwaki Grand Village (Bell Site) indicate that ritualized disposal behaviors may have impacted the archaeological visibility of bears, even after they became a more common dietary component. The increased consumption of bears appears to be related to changes in settlement and subsistence patterns associated with the influx of resettled peoples, their fur-trading related scheduling needs, climate change, and possible shifts in belief systems related to the great cultural stresses of the period.

Kozintsev, Alexander [92] see Kim, Alexander

Kradin, Nikolay (Russian Academy of Sciences)

[25] *The Northern Hinterland of Mongolian Empire: Urban Centers of Transbaikalia*

In Yuan shih chronicle Hasar, the brother of Chinggis Khan, is described as having the territory of the Argun River and nearby steppe. In the new Yuan empire, after change of the capital from the Onon–Herlen to the Orkhon valley, Eastern Mongolia and Transbaikalia were transformed from heartland into hinterland. Because of previous betrayals by his family Chinggis granted Hasar only four thousand yurts. Also, a city was built in what is today the Hailar/Hulumbur area of Inner Mongolia. This site, known as Khirkhira town or the Kondui palace was excavated by S. Kiselev in 1957–1959. After 2000, Russian scholars continued the studies of Mongolian urbanization in this area. This presentation will discuss results of those new archaeological discoveries. The excavations of three sites were studied; and it was different types of sites. Khirkhira was a real urban center and royal residence. Kondui was an imperial palace with servicing settlements, and Alestui an out-of-town palace.

Krahtopoulou, Athanasia [250] see Garcia, Arnau

Kramer, Andrew [40] see Eren, Metin

Krantz, Sarah (Barnard College, Columbia University)**[192] *Reevaluating Rock Art Panels in Northern New Mexico***

This paper examines what might be called the “palimpsest panel” rock art tradition of the northern Rio Grande region of New Mexico. Palimpsest panels are rock faces with petroglyphs that have accrued in a layered fashion through time. Prior research into such panels has typically focused on questions of chronology, each layer representing a distinct culture-historical era of iconographic production or a chapter in a linear chronology. Here, however, I move away from the traditional chronological approach, in order to examine the iconographic data present in the form of representation itself, the so-called palimpsest. The way that meaning develops through the act of layering is a process by which the icons interact and modify one another. Such an approach reveals not only the rich, information-laden periods between discrete chronological chapters but also demonstrates that palimpsests are far more than the sum of their parts.

Krasinski, Kathryn (Adelphi University), Brian Wygal (Adelphi University), Charles Holmes (University of Alaska Fairbanks) and Barbara Crass (University of Wisconsin-Oshkosh)**[387] *The Holzman Site: Faunal Remains from a Late Pleistocene Occupation in the Tanana Valley, Alaska***

The earliest archaeological sites in eastern Beringia occur at the gateway of the ice free corridor in interior Alaska. The Holzman site was discovered in 2015 along Shaw Creek in the Tanana Valley and dates to the late Pleistocene. Bison and caribou remains as well as mammoth ivory in the lowest components of the site demonstrate the importance of big game hunting during the colonization of Beringia and the interaction of humans with mammoths during the last phase of their extinction in interior Alaska. Abundant gastroliths suggest birds were also processed at the site. Zooarchaeological analysis, bone hearths, and associated lithics indicate definitive use of the materials by the earliest Alaskans.

[387] *Chair*

Krasinski, Kathryn [194] see Wells, Joanna

Kraszewska, Anna [389] see Ciesla, Magda

Krause, Rüdiger [76] see Heeb, Bernhard

Krause, Johannes (Max Planck Institute—SHH), Verena Schuenemann (Institute for Archaeological Sciences, Universi), Alexander Peltzer (Department for Archaeogenetics, Max Planck Inst), Wolfgang Haap (Department for Archaeogenetics, Max Planck Inst) and Stephan Schiffels (Department for Archaeogenetics, Max Planck Inst)**[203] *Ancient Egyptian Mummy Genomes Suggest an Increase of Sub-Saharan African Ancestry in Post-Roman Periods***

Egypt, located on the isthmus of Africa, is an ideal region to study historical population dynamics due to its geographic location and documented interactions with ancient civilizations in Africa, Asia, and Europe. Particularly, in the first millennium BCE Egypt endured foreign domination leading to growing numbers of foreigners living within its borders possibly contributing genetically to the local population. Here we mtDNA and nuclear DNA from mummified humans recovered from Middle Egypt that span around 1,300 years of ancient Egyptian history from the Third Intermediate to the Roman Period. Our analyses reveal that ancient Egyptians shared more Near Eastern ancestry than present-day Egyptians, who received additional Sub-Saharan admixture in more recent times. This analysis establishes ancient Egyptian mummies as a genetic source to study ancient human history and offers the perspective of deciphering Egypt's past at a genome-wide level.

Krause, Samantha (University of Texas at Austin), Timothy Beach (University of Texas at Austin), Sheryl Luzzadder-Beach (University of Texas at Austin), Thomas Harold Guderjan (University of Texas at Tyler) and Colin Doyle (University of Texas at Austin)**[243] *New Frontiers in Wetland Archaeology: Mapping Maya Agricultural Systems with Lidar***

Lidar has exponentially increased our knowledge of ancient agricultural systems and land use, especially within the Maya world. This paper explores a new lidar dataset for the Maya Lowlands in Northwestern Belize where archaeological and geoarchaeological teams have studied ditched and raised field systems for over 25 years. Through surveys and excavations, researchers in Northwestern Belize have shed light upon the importance of Maya wetland agriculture, but questions of spatial scale still remain. We are currently using increasingly advanced remote sensing techniques to better understand how intensive and expansive modification of lowland wet environments was within this region. This new dataset demonstrates the complexity of ancient Maya wetland agriculture in regard to spatial distribution as well as regional hydrology and topography. This imagery, considered alongside previous remote sensing data and both aerial and pedestrian survey, provides a robust dataset by which we can quantitatively consider the extent of wetland agriculture throughout in Northwestern Belize and throughout the Maya world. Further, this dataset provides insight into natural and anthropogenic wetlands in Belize, and provides a baseline for ongoing and future research for archaeology within tropical wetland systems.

Kretzler, Ian (University of Washington)**[17] *Locating Stories of Survival within the Colonial Archive: Crafting New Accounts of Grand Ronde History***

Archival material plays an important role in historical archaeological research. This is particularly true in studies of Native American communities of the recent past since the colonial archive comprises a sizable portion of available historical sources. Yet the archive must not be treated as a storehouse of

information alone, as it constitutes both state perceptions of Native lifeways and modes of knowledge production through which colonial projects were realized. When approached as sites of critical inquiry the archive's inconsistencies, omissions, and contingencies may be used to better understand the ways Native communities subverted, accommodated, and lived through European and American colonialisms. This paper explores how community-based historical and archaeological research with the Confederated Tribes of Grand Ronde Tribal Historic Preservation Office lends new insight into the history of the Grand Ronde Reservation from its establishment in the mid-1850s through the early twentieth century. Reading government reports, maps, and correspondences against ethnographic information, community knowledge, and archaeological data displaces assimilationist narratives within dominant accounts of tribal history, replacing them with stories that foreground community survivance. This work refashions the colonial tools that created and maintained the Grand Ronde Reservation into sources of capacity building and decolonization.

Krier, Jon (Oregon State University)

[47] *Looking for Fish of the Right Age: Using GIS in Conjunction with Salmon Genetics to Identify Key Submerged Drainages*
Geospatial analysis of Beringian bathymetric data provides powerful tools for formulating predictive modeling of submerged sites of Pleistocene age. With the acceptance of Pre-Clovis archaeological sites in the Americas (Jenkins et al. 2012), attention has shifted to alternative models of the peopling of the Americas. A Coastal Migration hypothesis has been proposed by Erlandson et al. (2013, 2015), however any evidence of such a route is now submerged. Ice free areas along the Pacific margin of North America would have provided refugia for early peoples. Inspired in part by Haida traditional histories, this analysis is attempting to identify streams that could have supported anadromous fish species, like salmon. In addition to being an attractive resource in their own right, anadromous species provide marine derived nutrients to a variety of terrestrial taxa. More broadly, incorporation of genetic data and contemporary population studies provides insight into the effects of climate change on economically important species. This study provides preliminary results of hydrologic analysis as well as recommendations for future inquiry.

Krigbaum, John [144] see Fitzhugh, Ben

Krigbaum, John (University of Florida), Christina M. Giovias (University of Queensland) and Scott M. Fitzpatrick (University of Oregon)

[156] *Agouti Commensalism? An Open Question in the Prehistoric Lesser Antilles, West Indies*
Light isotope data for bone collagen, bone apatite, and tooth enamel apatite have been collected for prehistoric agouti (*Dasyprocta* sp.) recovered from secure archaeological contexts on Carriacou (Sabazan and Grand Bay) and Nevis (Coconut Walk) in the Lesser Antilles, West Indies. Stable carbon isotope ratios of individual specimens exhibit a wide range of values for both bone collagen (−20.0‰ to −11.5‰; avg = −17.8‰) and bone apatite (−13.6 to −6.5‰), with apatite-collagen spacing also quite varied (3.6‰ to 9.9‰; avg = 7.0‰). Corresponding nitrogen isotope ratios from these samples also exhibit heterogeneous values (6.2‰ to 11.7‰; avg = 8.0‰). The frugivorous feeding habits of agouti suggest they should exhibit a more consistent dietary pattern; however, results underscore marked dietary variation and suggest a degree of commensalism for some, but not all, individuals sampled from Carriacou and Nevis. Results are consistent with two models for human–agouti interaction: 1) mixed hunting of wild animals with captive management of others; and 2) garden hunting of agouti drawn to human agricultural fields. We explore the archaeological and ecological implications of both models.

[284] *Chair*

Kristan-Graham, Cynthia (Auburn University)

[119] *Family Trees and Feathered Serpents at Chichén Itzá: Expanding H. B. Nicholson's Understanding of Kukulcan*
While H. B. Nicholson's magnum opus about Topiltzin Quetzalcoatl concentrates on ethnohistory, he acknowledges that some imagery at Chichén Itzá may highlight the feathered serpent's role as patron. I propose other readings for Kukulcan ("Feathered Serpent" in Yucatecan Maya) at Early Postclassic Chichén Itzá. Linguistic and ethnographic evidence indicates that the feathered serpent symbolizes lineage and ancestry and that rattlesnake physiognomy intersects with fertility. These readings intersect with Nicholson's interest in language and Topiltzin Quetzalcoatl's genealogy, and with Chichén Itzá's visual culture wherein painting and sculpture highlight lineage.

[179] *Discussant*

[179] *Chair*

Kristiansen, Kristian

[324] *Discussant*

Kristensen, Tood [91] see Morin, Jesse

Kristoffersen, Elna Siv (University of Stavanger)

[35] *The Northern Way: Conceptualization of Nonhuman Animals in the Animal Art of Fifth–Sixth-Century Norway*
The presentation takes up a northern way of expression opposed to a southern one—namely the stylistic depiction and focus on animals and mixed animal/human designs prevailing in the Nordic Barbaric area opposed to a focus on the naturalistic ideal of the human body throughout the classical world. The complexity and continuity of this Nordic art form indicates that it was structurally incorporated in an overarching principle that reflects social and cosmic order. The mixed animal-human designs create species that cross-cut traditional categories and enforce reflections on such relationships. On such a basis certain motifs within the Animal Art open up to a pre-Christian understanding of the potential for interchangeability between not only animals and humans—but also objects, where a basic transformative logic is evident. It is, however, a question whether the hybridity in the representations, in their bringing together of different elements and the overcoming of boundaries, might be taken as an expression of a relationship in real life without opposition or distinction. And whether investment of creativity in their representation might be taken as an indication of the essentiality of these designs in respect of ideas of a transcending relationship between animals and humans.

Kristy, Gwendolyn (University of Chicago), Kate Frank (University of Chicago) and Emily Hammer (University of Chicago)

[151] *The Impacts of Urbanization on Archaeological Site Preservation in Afghanistan*
Urbanization is a significant force affecting the preservation of archaeological sites across the globe. Even in war-torn countries such as Afghanistan, urbanization dramatically outpaces looting and other forms of site destruction that have been highly visible in the media. We present data on how urbanization has affected archaeological site preservation across Afghanistan. Using the city of Herat as an example, we present a method for predicting how urban growth will affect archaeological sites in the coming decades. This method draws on historical aerial and satellite imagery, historical maps and gazetteers, modern urban planning data, and predictive modeling within a GIS.

Kromberg, Beau [91] see Burns, Samuel

Kroot, Matthew (Santa Clara University)

[54] *Back to Basics: Analyzing Knapped Stone Recovered During Survey in Southeastern Senegal*

Archaeological ethics require all sites identified on survey to be reported and described in such a manner as to allow for the archaeological community to understand their research potential. This can present a challenge in regions without a significant body of previous research to aid in the interpretation of finds. The Bandafassi Regional Archaeological Project in southeastern Senegal faces just such a situation. A research question driven survey strategy, directed at the archaeological record of the Atlantic Era and using current methods for regional analysis, has produced a wealth of knapped stone finds from preceramic periods, which cannot be easily interpreted and reported in any useful manner. This is due to a lack of established detailed local culture-history chronologies for preceramic periods, utilizing technological and morphological typologies for knapped stone artifacts. This paper explores how methods of analysis borrowed from other well-researched regions have and have not been successful in generating interpretations. In many ways, this process has required a return to some of the earliest and most basic methods in archaeology, as well as an alteration of research strategies in order to meet the basic recording and, therefore, interpretive requirements of regional survey.

[54] *Chair*

Krug, Andrew (University of Missouri), Andrew Fernandez (University of Missouri), Brenton Willhite (University of Missouri), Christine VanPool (University of Missouri) and Clayton Blodgett (University of Missouri)

[237] *From Plain Wares to Polychromes: A Geospatial Evaluation of Ceramics in the Casas Grandes Region*

The past 25 years have seen a significant increase in archaeological fieldwork in the Casas Grandes region of Chihuahua, Mexico. Among significant issues in Casas Grandes archaeology is the relationship between sites close to Paquimé and those in its borderlands. Investigations into ceramic distributions across the landscape have the potential to provide a greater understanding of the relationship between sites and their relationship to Paquimé. In this study, we reexamine Carpenter's (2002) influential map of ceramic types distribution by examining ceramic assemblages (e.g., Casas Grandes Polychromes, Salado Polychromes, and El Paso Polychrome) at various sites (e.g., Brand's surface collections, Janos joint project surface collection, and excavated wares from Galleana, Villa Ahumada, and 76 Draw) within the region. These data are analyzed via ArcGIS, which contains analytical applications that can be used to address the mechanisms behind geospatial variation. Ultimately, we find that a few ceramic type "zones" need to be reconsidered and likely remapped.

Krug, Andrew [155] see Willhite, Brenton

Krummel, Jordan [210] see McCall, Grant

Krus, Anthony (Scottish Universities Environmental Research Centre)

[81] *Gathering Shells and Time: A Bayesian Approach to Shell Mound Formation in Southwest Florida*

Archaeologists have longed grappled with how to effectively date shell mound deposits in Florida. Interpreting radiocarbon dates from shell samples has been a dominant method; however, these interpretations have not fully assessed the possibility that radiocarbon samples might not truly date their corresponding archaeological context. For example, recent research on Mound Key demonstrates that shell from middens was likely used to construct shell mounds, therefore the redeposition of old shells further complicates interpretation of the radiocarbon data. In this paper we critically evaluate the existing radiocarbon samples for shell deposits at two sites (Mound House and Big Mound Key) located on Florida's southwest coast and use a Bayesian approach to create site chronologies informed by stratigraphic contexts and feature formation processes. The selection of radiocarbon samples at these sites was not taken with a Bayesian approach in mind; however, the available data lends itself nicely to Bayesian modeling. The results address previous conclusions about the timing and span of activity and the suitability of certain shellfish species for radiocarbon dating. Together, the models for these sites and Mound Key provide regional insight into the timing and tempo of shell mound activity in southwest Florida.

[254] *Discussant*

[81] *Chair*

Krus, Anthony [144] see Sayle, Kerry

Kruse-Peeples, Melissa (Arizona State University)

[129] *Landscape Legacies in Central Arizona: Archaeologists and Ecologists Working Together*

Archaeologists have long used environmental data to reconstruct the past. Recently, environmental scientists have come to realize the value of incorporating archaeological viewpoints in understanding modern ecological systems. It has been shown that human activities, even those that are relatively non-intensive, have the potential to result in long-lasting ecological transformations. Cross-disciplinary alliances between archaeologists and environmental scientists are necessary if we are to truly understand the modern and future trajectory of ecological systems. One outstanding example of such an alliance is the Legacies on the Landscape Project spearheaded by Katherine Spielmann. Working together, not just borrowing from other disciplines, a collaborative team of archaeologists, soil scientists, and plant ecologists developed innovative research designs to study the Perry Mesa landscape in Central Arizona and document the long-term ecological transformations. In this paper I will provide an overview of the collaborative process of this project and review the document the ecosystem changes brought about by the thirteenth- and fourteenth-century occupation by sedentary agriculturalists. Conclusions will focus on the ways in which the collaborative alliance has helped to advance the fields of archaeology and ecology.

Kubicek, Richard (University of Wisconsin-Milwaukee) and Patricia Richards (University of Wisconsin-Milwaukee)

[341] *\$1.87 Each, Four Feet Long and Over; \$0.87 Each, Less than Four Feet: A Spatial Analysis of Coffin Type and Coffin Hardware from the Milwaukee County Poor Farm Cemetery.*

Excavations at the Milwaukee County Poor Farm Cemetery (MCPFC) in Wauwatosa, Wisconsin, in 1991 and 1992 recovered 1,649 individuals associated with Milwaukee County's practice from the mid-1800s through 1974 of providing burial for institutional residents, unidentified or unclaimed individuals sent from the Coroner's Office, and community poor. In 2013, Historic Resource Management Services of the University of Wisconsin-Milwaukee recovered an additional 632 individual coffin burials representing over 800 individuals. Richards (1997) proposed a land use timeline for the portion of the cemetery excavated in 1991 and 1992. This poster presents the consolidated data from all excavated graves to date. In particular, we focus on associating the distribution of coffin hardware and coffin type with other classes of material culture in order to interpret spatial patterning and refine the land use history of the Milwaukee County Poor Farm Cemetery.

Kuehn, Steven R. (Illinois State Archaeological Survey)**[127]** *The Changing Role of the Domestic Dog: New Evidence from the American Bottom Region of Illinois*

Recent archaeological investigations in the American Bottom have resulted in the identification of several hundred individual dog remains from Late Woodland (AD 650–900), Terminal Late Woodland (AD 900–1050), and Mississippian (AD 1050–1400) components. Ongoing research, including coprolite and isotopic analyses, as well as traditional osteological and pathological studies, is providing important new insight on the diet, treatment, and changing roles of domestic dogs in prehistoric Native American communities. The data obtained thus far indicate notable shifts in dog roles between the Late Woodland, Terminal Late Woodland, and Mississippian periods. Although dogs served in multiple capacities during all three periods, the strongest evidence for ceremonial use and ritual feasting occurs during the Late Woodland and Mississippian periods. In contrast, dogs were used extensively as transport animals during the Terminal Late Woodland period. With this expanding database, it is now possible to begin addressing more detailed, in-depth research questions regarding human-canine relationships in the American Bottom, with broader implications for dog studies across the continent.

Kuehn, Steven R. [61] see Smith, Beverley

Kuester, Falko [29] see Meyer, Dominique

Kuffner, Kim [263] see Heizer, Melanie

Kuhn, Steven (University of Arizona) and Mary Stiner (University of Arizona)**[286]** *A Road to Forager Cooperation*

Humans have a unique capacity among primates for cooperation. Recent foragers routinely cooperate in economic activities, and a range of social mechanisms help maintain that cooperation. We argue on the basis of hunting practices and weapon systems that some of these social mechanisms emerged comparatively late in hominin evolutionary history. Large game hunting by Early and Middle Pleistocene hominins involved simple, short range weapons and depended on participation of multiple individuals. The interests of participants were closely aligned in these contexts. Nearly everyone was present at the kill, making cooperation and sharing easy to monitor and maintain. The appearance of long-distance projectile weapons in the Late Pleistocene enabled one or a few individuals to take large, elusive game more efficiently. This freed some individuals to pursue other economic activities, providing a broader and more flexible economic base for the group. However, greater autonomy also created more opportunities for deception and unbalanced reciprocity. When individuals have greater latitude to act as free agents, various social mechanisms can help to ensure honesty and equity. The intense leveling mechanisms documented among egalitarian hunter-gatherers likely evolved in response to the tensions which arose from greater independence in foraging.

[338] *Discussant***Kuijt, Ian (University of Notre Dame)****[278]** *Micro-History and Macro-Evolution: Material Geographies of Multifamily Neolithic Households*

The Near Eastern foraging to farming transition was characterized by the emergence of more powerful nuclear family and multifamily households. It remains unclear, however, how this longer-term evolutionary transition was connected to small-scale daily household decision-making. Focusing on the archaeology sites of Tell Halula and Çatalhöyük, I explore archaeological evidence for the development of Neolithic multifamily households, and how they may have been connected to seasonal collective labor, and were maintained through collective burial practices that focused on lineage houses. I argue that small-scale decision making related to Neolithic household food storage and population growth created the context for the long-term evolutionary development of entrenched intra-household differentiation, and the development of multifamily households living in multiple residential buildings. Although difficult to address, the short-term control of household ritual practices may have served as a means for the development of more powerful, and larger, inter-generational households.

[207] *Discussant***[207]** *Chair*

Kuijt, Ian [141] see Shakour, Katherine

Kulaga, Nicole (National Park Service)**[89]** *A Study of Lithic Debitage from Talepop (CA-LAN-229) at Santa Monica Mountains National Recreation Area, California*

CA-LAN-229 is a prehistoric archaeological site and an ethnohistoric Chumash village, Talepop, in the interior Santa Monica Mountains in southern California with evidence of human occupation stretching nearly 9,000 years. There are both chronometric and ethnographic lines of evidence which indicate a punctuated occupation from 5000 BC up until the 1800s. The longevity of the occupation of the site provides a rare opportunity to study and test chronologies. The site is also distinctive because of its location within the interior of the mountains. Most other large mainland sites with village occupations in the region are located on the coast or in major valleys. Recent and past excavations of CA-LAN-229 recovered many lithic artifacts, most of which, unsurprisingly, are debitage. While chronologies for shell beads and groundstone have been researched for this region of California, much less emphasis has been placed on lithic artifacts, especially lithic debitage. Debitage analysis can provide insight to a site's function, organization, favored materials, and trade. This research will analyze the debitage of CA-LAN-229 in order to gain a better understanding of the human behaviors taking place there, how they may have changed through time, and how these behaviors may be different from their coastal neighbors.

Kulick, Rachel (University of Toronto)**[354]** *Urban Micromorphology at Bronze Age Palaikastro, Crete: Evidence of Transitions*

Sequences at Bronze Age Cretan settlement sites are defined by destructive events, natural or anthropogenic, that capture cultural material in a particular time and space. The traditional approach of studying urban archaeological contexts based on these snapshots of material culture is not completely suitable for analyzing transitional phases that occur between these events. However, detailed micromorphological examination of the sediments present in these transitional stratigraphic sequences can fill the gaps in understanding how and when sites transition from one phase to another. Being able to identify the temporal and spatial relationship and exact nature of these transitional periods of destruction, abandonment, or other processes is essential in forming these interpretations, and approaches focusing on these transitions have not been systematically practiced at Bronze Age Cretan sites to date. This paper will discuss the results from the soil thin section analyses conducted during the 2013–2015 Palace and Landscape

at Palaikastro (PALAP) excavations and will elucidate the anthropogenic activities, processes of site formation, and broader landscape transformation in these transitional periods.

[354] Chair

Kulisheck, Jeremy (Cibola National Forest and Grasslands), Sandra Arazi-Coombs (Cibola National Forest and Grasslands), Jess Gisler (Cibola National Forest and Grasslands), Kathi Turner (Cibola National Forest and Grasslands) and Christina Sinkovec (Army Corps of Engineers, Albuquerque District)

[301] *An Agricultural Landscape on the Northern Mimbres Frontier, South-Central New Mexico, USA*

The Cañada Alamosa is the northernmost frontier of the ancestral Pueblo Mimbres people of the U.S. Southwest. Intensive survey of a side canyon has defined a distinct agricultural landscape composed of small pueblos, farmsteads, field houses, shrines, and other features. Occupation was centered around alluvial fans located on the first terrace above the drainage, fed by runoff from upper terraces, rather than the floodwaters of the drainage bottom itself. While the Cañada Alamosa has significant later Tularosa and Mesa Verde occupations, use of this agricultural landscape is confined to the Classic Mimbres phase, AD 1000–1130. This agricultural landscape reveals both spatial and temporal diversity in farming practices in the eastern Mimbres area, with implications for the understanding of social and economic changes in this part of the region during the later years of ancestral Pueblo occupation.

Kullen, Douglas (Burns & McDonnell)

[376] *Identifying Hide-Processing Activity Areas at Hunters Home*

Testing and data recovery at the Hunters Home site (11Wi398) in Naperville, Will County, Illinois, recovered nearly 60 formal end scrapers. Microwear analysis determined that more than 80% of them exhibited traces of use wear, and, of those, nearly 90% showed evidence of hide working. Spatial relationships between hide scrapers, burnishing stones, ochre crayons, and refitted fire-cracked rocks were examined to define discrete, hearth-centered, hide working activity areas within the site.

Kumar, Ajit [167] see Vasantha, Rajesh

Kupriyanova, Elena [323] see Hanks, Bryan

Kurnick, Sarah (University of Colorado Boulder)

[204] *Navigating Social Memories and Reshaping Built Environments: An Analysis of Postclassic Reoccupation in the Yucatán Peninsula*

Societal regenerations are common events in world history. Be they in ancient times, the recent past, or the present, such regenerations are instructive and encourage reflection on several critical issues. How, for example, do those exercising political authority negotiate traumatic social memories? And how, if at all, are preexisting built environments modified? To addresses these and other questions, I examine the regeneration of communities and the reestablishment of political authority in the northern Maya lowlands during the Postclassic period. In this presentation, I analyze the built environments at a series of coastal and inland sites in the eastern Yucatán Peninsula, and suggest patterns in Postclassic reoccupation and Postclassic treatment of the Classic period past. In doing so, I emphasize the importance of place, the past, and the built environment to the operation of political authority, as well as the usefulness of archaeology in understanding ancient, historical, and contemporary events.

Kusimba, Chapurukha

[136] *Contextualizing Ritual and Collapse in Eastern and Southern African Chiefdoms and States*

The role of ritual in the rise of complex societies is well understood in many regions of the world. In contrast, the roles ritual may have played in state collapse, regeneration, and resilience remains inadequately theorized in archaeological studies of the political dynamics of complex societies. This paper will evaluate the role of ritual in the emergence, resilience, and collapse of chiefly and state societies in Eastern and Southeastern Africa. Social and symbolic factors especially the role of ritual and ritual experts, who included master smiths, rain makers, healers, soothsayers, and shamans has remained sorely understudied in the archaeology of state formation in Africa. This paper will examine evidence of the role of ritual in the context of an emerging theoretical perspective in archaeology of the collapse of the state in Africa. I argue that understanding how ritual knowledge and expertise was nurtured, used, abused, and discarded in the service of the state is critical to unveiling how power was negotiated between communities, among various disparate stakeholders, both during the precolonial, colonial, and postcolonial Africa to address overlapping forms of social, political, economic, and technological interactions.

Kuwanwisiwma, Leigh (Hopi Cultural Preservation Office)

[34] *Hopi Migration Traditions: A Fulfillment of the Spiritual Covenant*

For thousands of years, the Hopi clans have traversed both the South and North American continents. Today, this presence is evidenced by the thousands of Hopi/Puebloan archaeological ruins. As well, esoteric ceremonies of today are ancient ceremonies and reinforce a living connection to our cultural history and religion. This great migration period of Hopi people was in fulfillment of a spiritual covenant between clans and our spiritual deity and guardian called Ma'sawu. Ma'sawu is the guardian and caretaker of this fourth world. So to earn the honor of living with him, clans submitted to this covenant to place our cultural footprints on both continents. If clans completed journeys to the four cardinal directions, then they were instructed to wait and eventually be led to their final spiritual home, the Hopi mesas in northern Arizona. This fulfillment of the covenant would grant the Hopi people a title of universal stewards. Today these footprints are represented by ancient Hopi ruins, landscapes, burials, pottery sherds, petroglyphs, and trails.

Kuzminsky, Susan C. (Universidad Católica del Norte, Chile, University of California, Santa Cruz)

[143] *Assessing the Population History of the Atacama Desert using 3D Geometric Morphometric Methods*

Many scholarly debates in South American archaeology have centered on the discovery and cranial morphology of the earliest inhabitants known as Paleoamericans that predate 8000 years BP. Although it was initially hypothesized that cranial differences between Paleoamericans and later populations may reflect distinct biological populations or migration patterns that occurred after the initial colonization of South America, recent genetic data show biological continuity throughout the Holocene in western South America. Given that the current archaeological evidence suggests an early and rapid Pacific coastal migration occurred during the colonization of the Americas, and that several early archaeological sites are located along the coast and in the highlands of Chile, our study focused on a skeletal series from the Atacama Desert where several Paleoamerican skeletons have been excavated. Using 3D scanning and geometric morphometric methods, we examined morphological variation among the Paleoamericans and other prehistoric populations of the Atacama Desert covering a 9,000-year temporal sequence. Our results show biological continuity among several groups within our skeletal series from this region, suggesting that gene flow and complex trade networks contributed to the evolutionary adaptations and population history of the Atacama Desert throughout the Holocene.

[143] Chair

Kuzminsky, Susan C. [143] see Poulson, Simon

Kvetina, Petr (Institute of Archaeology Prague, Czech Republic) and Jiri Unger (Institute of Archaeology Prague, Czech Republic)
[189] *Digital On-Site Presentation of the Invisible Past*

The aim of the paper is to demonstrate the possibility of broad spectrum of digital methods for presentation of archaeological sites. This approach is extremely valuable in locations where there is neither any preserved construction, nor any relic of the original appearance of the past structures and landscape. Such sites usually meet with indifference both from the public and from institutions involved in preservation of historical monuments. The possibility of creating virtual and augmented reality proved to be a potential tool to grasp the invisible and to describe the disappeared. On the examples of several Central European sites spanning from the Early Neolithic to Medieval times we show a potentially powerful tool for digital heritage management. Several technological platforms can be interconnected to provide a classical static approach of exhibiting artifacts (in the form of open library of 3D scans), which however may be expanded with dynamic level including augmented and virtual reality, videos and other interacting features. The acquired digital records can also serve as open access sources for research and educational purposes at all academic levels.

Kwak, Seungki (University of Oregon)

[24] *Ancient Residues Indicate Prehistoric Subsistence and Culinary Practices in the Korean Peninsula during the Middle Holocene*

This study attempts to understand ancient human subsistence using isotope analysis on the organic residues extracted from the archaeological potsherds collected from prehistoric coastal shell midden sites in the southern part of the Korean peninsula. In Korean archaeology, shell middens are useful for isotope analysis because they provide suitable condition in terms of organic preservation. To date, the subsistence of these prehistoric coastal and island dwellers remains poorly known. However, this may be addressed through the study of ceramic containers, which were often used for culinary practices, by extracting organic residues of the foodstuffs that remain on the interior wall or inside of the clay matrix. Carbon isotope analysis on those residues provides an opportunity to understand ancient human subsistence strategies in the region.

Kwan, Daniel (University of Toronto)

[78] *A Thin Section Petrographic Study of Early to Late Shangshan Ceramics from Zhejiang, China*

Ceramics from the early Holocene Shangshan Culture, in Zhejiang Province, China, have been subjected to thin section petrographic analysis in order to characterize clay groups, view production patterns, and aid in the development of a complete understanding of the Shangshan technological tradition. Analysis has revealed a pattern in the local production of ceramic vessels likely related to the transformations in cooking methods and dietary patterns that coincided with new evidence for the beginnings of rice domestication in central China.

Kwan, Daniel [33] see Yasui, Emma

Kwok, Cynthia, Sandra Garvie-Lok (Department of Anthropology, University of Alberta) and Mary A. Katzenberg (Department of Anthropology & Archaeology, University)

[30] *Exploring Sex-Based Variation in Infant Feeding Practices in Byzantine Greece Using Stable Isotope Analysis of Dentin Serial Sections*

This paper explores whether sex-based differences in infant feeding practices existed at the early Byzantine Greek site of Nemea (fifth-sixth c.). Dentin serial sections were obtained from the permanent first molar and first premolar from 31 adults (11 males, 8 females, 12 unidentified) and analyzed for stable carbon and nitrogen isotopes. The isotopic data demonstrated that most individuals were breastfed and fully weaned at a mean age of 2.6 with a range of 1.8 to 3.6 years. Sex-based differences were not observed as boys and girls on average were fully weaned at 2.5 (1.9 to 3.3 years) and 2.4 (1.9 to 3.6 years) years, respectively, contrary to the patriarchal structure of Byzantine society. These results are discussed in the context of Byzantine society through the use of written sources. Compared to traditional analyses using subadult bone collagen, dentin serial sections can capture nuances within infant feeding practices and the value of this latter method is highlighted.

Ladefoged, Thegn (University of Auckland) and Benjamin Davies (University of Auckland)

[38] *Emergent Landscapes: Simulating the Distribution of Residential Features in a Hawaiian Dryland Agricultural System*

Cultivation in the Leeward Kohala Field System (Hawai'i Island) required sufficient rainfall for crops to flourish. Periodic droughts restricted production to upper elevations where orographic rainfall was higher and more dependable, likely influencing the labor needs and settlement patterns of resident populations. We employ a series of spatially-explicit agent based models incorporating cultural conceptions of kapu (sacred) and noa (profane) in conjunction with environmental parameters and individual decision-making. The models explore how the ecodynamics of land use and postdepositional processes within this highly productive rain-fed agricultural system combined to pattern the distribution of archaeological features we observe in the present. We propose that the constriction and expansion of cultivation in response to variation in seasonal and annual rainfall produced a palimpsest landscape of periodically abandoned and reused residential features and temporary structures.

Ladrón de Guevara, Sara [3] see Bernard, Henri

Ladrón de Guevara, Sara [10] see Budar, Lourdes

Laffey, Ann (University of Florida)

[173] *Big Plans for Small Pots: Development of an Organic Residue Analysis Protocol for Ancient Wari Miniature Wares*

Excavations from the Monqachayaq sector of the site of Huari uncovered an impressive burial that contained over 300 miniature vessels. The vessels were offered by a people known as the Wari (c. AD 600–1100), an ancient culture thought to be responsible for one of the Andes first great empires. Even more remarkable, the vessels retained the desiccated remains of their contents. The anthropological insight that can be gained has direct implications for a better understanding of Wari practices and continuity of ritual behavior in the Andes in general. If it can be verified that the vessels contain a fermented beverage known as chicha it will speak to a long-held tradition in the Andes of offering the drink to dead ancestors. Furthermore, if compounds associated with hallucinogenic plants can be identified, it will add new elements of understanding to Wari ritual practice. This paper follows the development of an organic residue analysis protocol that will be used to delineate the content of the miniature vessels. It begins with macro and

micro archaeobotanical analyses and leads into chemical analyses, which include bulk stable isotope analysis, gas chromatography-mass spectrometry, compound specific stable isotope analysis, and high performance liquid chromatography.

[173] Chair

Laffoon, Jason [133] see Leppard, Thomas

Lagle, Susan (University of California, Davis)

[169] *Integrating Faunal and Lithic Evidence from Quina Mousterian Contexts in Southwestern France to Investigate Neanderthal Subsistence Strategies and Mobility*

The interpretation of Middle Paleolithic archaeological assemblages has been the subject of spirited debates among researchers of Neanderthal behavior for over half a century. While these debates have classically centered on analyses of lithic assemblages (e.g., the “Bordes-Binford debate”), it is important to recognize the value of incorporating the associated faunal records in our approach to these questions. Differences in lithic assemblages may be affected by factors like mobility, which may in turn be influenced by subsistence strategies. Changes in prey resource type and availability during differing climate periods could impact how Neanderthals navigated their landscape, affecting both hunting and prey processing practices as well as tool-making decisions. Future research into Neanderthal behavior could benefit from a more holistic approach in which foraging theory is applied to the faunal record and then aligned with studies of lithic attributes relating to mobility. An application of this approach will be discussed in terms of Quina Mousterian archaeological (faunal and lithic) assemblages in southwestern France.

Lahaye, Christelle [90] see Feathers, James

Lake, Mark (University College London)

[38] *What We Choose to Model and How We Think the World Works*

In 1972 David Clarke argued that “models are pieces of machinery that relate observations to theoretical ideas.” That “machinery” does not have to be computational, or even quantitative, but with the resurgence of interest in simulation, the adoption of methods from evolutionary biology and the development of more sophisticated spatial statistics, it is increasingly both. Many of the papers in this session are case studies that explore exactly the issue of how effectively we can use models to connect observation and theory—essentially a question of epistemology, or how we get to know about the world. But of course even the most rigorous and effective use of explicit models to connect observations and ideas can only answer the questions we actually ask, so this paper compliments others by reviewing the sorts of models that we offer up against reality, in other words, what aspects of the world interest us and what kinds of relationships do we typically posit between them. Drawing on published examples, I will sketch key debates surrounding description versus explanation, individuals and aggregates, and cause and effect.

Lakevold, Courtney (University of Alberta; Government of Alberta) and Jennifer Hallson (University of Alberta)

[339] *Population Size and Structure in the AD Thirteenth-Century Occupation of Promontory Cave 1*

The extraordinary preservation and narrow time frame (AD 1240–1290) for the occupation of Promontory Cave 1 on Great Salt Lake allow for unusual insights into the population and demography of its Promontory Culture inhabitants. We use two methods to determine population size. First, with accurate data on the habitable space in Cave 1, we calculate space needs per person from ethnographic accounts of Western North American hunter-gatherer groups in order to estimate likely group size. Second, artifact densities are calculated and projected into the entire cave volume using mathematical and GIS methods. The number of moccasins will be the focus because of the sound ethnographic knowledge of their use and discard rates. We apply accumulation equations to these projection results to determine population size, taking into account the duration and time of the occupation of the cave. These two methods will be compared and discussed to provide a likely size for the population inhabiting Promontory Cave 1.

Lakevold, Courtney [91] see Morin, Jesse

Lam, WengCheong (Chinese University of Hong Kong Department of Anthropology)

[58] *Archaeology of Iron in the Lingnan Region and the Imperial Strategy of the Han Dynasty in its Southern Peripheries*

Although the imperial strategy of the Han Empire in its southern peripheries attracts significant scholarly interests, how to synthesize the issue of ethnic integration and imperial expansion within the study of material culture is still widely under-addressed. Especially, how the Han’s control over the movement and distribution of iron—a strategic resource for agricultural and military conquest—is almost overlooked in the literature. This presentation presents the latest statistical studies on the assemblage of iron objects from burial contexts in the Lingnan region to identify relations between the procurement and burying of iron and the ethnicity as well as rank of tomb owners. Through a comparison with the distributional pattern of iron objects found in Han tombs in the Yungui plateau after the Han conquest, this study also attempted to depict the distribution of iron materials on a macro-regional scale in order to articulate the underlying political strategies reflected by the strategic material.

[58] Chair

Lamb, Céline (University of Kentucky)

[101] *Constructing Rural Complexity: Intra-household Relations of Community and Inequality at Chunhuayum, Yucatán, Mexico*

The concept of rural complexity acknowledges that social, political, and economic complexity is not limited to large urban centers (Iannone and Connell 2003; Schwartz and Falconer 1994). Like urbanites, hinterland residents are involved in diverse and shifting interactions through which they form, maintain, and reinvent relations of commonality and social differentiation. Chunhuayum, a small settlement located in the Northern Lowlands and occupied from the Late Preclassic through the Late Classic, presents an excellent case study to address ancient Maya complexity from a hinterland perspective and at the micro-scales (household and communities) of human interaction, due to its separation from larger centers, its lack of monumental architecture, and its internal heterogeneity. Using recently collected data concerning settlement patterns, domestic architecture and household assemblages, I infer: 1) the degree to which households were integrated into a cohesive community, 2) local inequalities, and 3) the material and social practices that may have expressed, (re)produced, and structured understandings of commonality and distinction over time. Reframing discussions of complexity to focus on the micro-levels of human interaction within a lower-order rural settlement, this research contributes to a more inclusive and nuanced understanding of ancient Maya social complexity.

Lambert, John [342] see Hill, Matthew G.

Lambert, Spencer (Brigham Young University), Robert Bischoff (Brigham Young University) and Joseph Bryce (Brigham Young University)**[181]** *Feathered Fauna: A Look at Bird Usage among the Fremont*

Bird use among the Fremont is a topic that has been under studied in recent times by archaeologists. We seek to address this lack of current information regarding how birds were used by the Fremont. Although birds likely only played a secondary role in the subsistence economy when compared to large mammals, birds were clearly a supplemental food source. In addition to being a food source, wing and leg elements of large birds were sometimes modified and used as a bone resource for constructing cultural artifacts such as beads and whistles. Indeed, birds likely played an important role in both subsistence and social activities in Fremont society. There has also been research arguing for the existence of a Fremont bird cult. Newly obtained bird bone data from sites in Utah Valley have bird bones found in a variety of contexts. We will compare new bird bone data to other Fremont sites excavated in the past several decades, to present a more recent analysis about bird use among the Fremont.

Lambert, Stephanie (Brigham Young University), Elizabeth Whisenhunt (Brigham Young University) and Spencer Lambert (Brigham Young University)**[367]** *Fremont Abandonment Practices: A Case Study of Ventilation Tunnels at Wolf Village*

Ventilation tunnels were commonly used by the Fremont to circulate air within their subsurface buildings. However, there is evidence that ventilation tunnels at Wolf Village, a Fremont site south of Utah Lake, were used for more than circulating air. Our research will explore possible ritual abandonment practices of the Fremont by analyzing the six ventilation tunnels and their associated artifacts uncovered at Wolf Village. Evidence of ritual abandonment practices can include finding articulated animal bones and high value artifacts, such as figurines and trade items, purposefully placed in the ventilation tunnel just prior to disuse. We will compare our findings from Wolf Village to ventilation tunnels at other Fremont sites. By studying ventilation tunnels and the items found in them, we can gain greater insight into possible abandonment practices and expand our knowledge of the Fremont culture.

Lamnidis, Thiseas [143] see Posth, Cosimo

Lamoureux St-Hilaire, Maxime (Tulane University), Marcello A. Canuto (Tulane University), Tomás Barrientos (Universidad del Valle de Guatemala) and Clarissa Cagnato (Université Paris 1-Panthéon Sorbonne)**[274]** *Detecting the Functions of Patios in a Classic Maya Regal Palace at La Corona, Guatemala.*

Classic Maya regal palaces were political institutions with many functions, ranging from domestic and ceremonial to administrative. This paper presents the results of the multifaceted study of three adjoining patios of the palace at the Classic Maya Center of La Corona, Guatemala. Research suggests that these patios, dating to final phases of occupation in the Late Classic (eighth and ninth centuries AD), were open spaces dedicated to activities relating to the preparation of food, the manufacture of artifacts, as well as the storage and discard of both perishable and durable goods. This study exhaustively sampled these spaces to study the composition of their stucco floors, associated micro- and macro-artifacts assemblages, and macrobotanical remains. The results of the artifactual, flotation, and ICP-MS analyses of the sampled patios indicate the ancient functions of those spaces to a scale much finer than traditional archaeological methods could. This study will use these data to consider the economic and logistical roles of the members of Classic Maya palaces in order to better understand the pragmatics associated with the exercise of power in ancient Maya society.

Lancelotti, Carla (Universitat Pompeu Fabra)**[274]** *Modeling Anthropic Activity Markers: A Multidisciplinary Approach to the Study of Plant-Related Domestic Activities*

The concept of Anthropic Activity Markers as ethnography-derived models to interpret archaeological activities has seen a remarkable development in recent years. In this talk we present the results of MoMArq (Modelización de Marcadores de Actividades Antrópicas: de lo etnográfico a lo arqueológico), a multidisciplinary project that combined cross-cultural studies with analyses of phytoliths, starch, multi-element geochemistry and spot-tests to analyze domestic plant-related activities in the past. The main focus of the project is on arid and semiarid areas. Starting from the Standard Cross-Cultural Sample (SCCS), we build and coded a small database that includes, alongside environmental data, ethnoarchaeological information (e.g., features that can be identified in archaeological record). We then used these data to create models of distribution of the above-mentioned proxies. Ethnography-inspired models were validated through ethnoarchaeological studies and applied to a domestic space in classical Greek Olynthos. This approach allows for a better identification of how people used domestic spaces in the past for plant-related activities, specifically food processing and consumption.

[274] *Chair*

Landa-Jaime, Victor [236] see Gomez-Gastelum, Luis

Landau, Kristin (Northwestern University)**[71]** *The Consequences of State Collapse: Evidence from the San Lucas Neighborhood during the Terminal Classic*

Understanding the growth and dissolution of state entities has long been a topic of anthropological inquiry. More recently, archaeologists are promulgating dynamic and careful conceptions of how leaders acquire power, and whether and why surrounding residents may support them. By turning our attention to the political economic relationship between Maya rulers and the local population, we can identify successful and failed attempts to maintain states. In this paper, I combine political anthropology with urban studies and practice theory to illustrate how the intermediate scale of neighborhoods can be useful for assessing state dynamics. I focus on the neighborhood of San Lucas during the Terminal Coner ceramic subphase (ca. AD 820–900) to examine the transition between the death of the last major ruler and the full onset of the Postclassic. Multiple lines of evidence from four architectural groups indicate that San Lucas residents enacted different living strategies in response to the dissolution of central government. For example, households established in the Preclassic continued to support small families, while higher status living arrangements were quickly abandoned. Such data offer a more nuanced picture of who emigrated from Copán and when, allowing us to infer the aftereffects of state collapse on residing populations.

Landry, Shannon (Alpine Archaeological Consultants, Inc.)**[368]** *Red or Green? Examining the Reliability of Macaw Postcranial Identification*

Archaeologists consider macaws highly valuable trade items which served an important economic and ritual role in the prehistoric Southwest. Costly to acquire, brightly colored, and difficult to keep, macaws are often an exciting indicator of social complexity. There is a consensus that the bright red Scarlet Macaw was used and traded with greater frequency than the emerald green Military Macaw in the American Southwest. Yet variation in size and morphological similarity of *Ara* sp. postcrania make species level identification of macaws exceedingly unreliable, making past identifications based on postcranial elements problematic. Aside from small-scale, though valuable, lines of inquiry on the topic (e.g., Bullock 2007), this problem remains understated. This poster explores the potential impacts of past, present, and future macaw postcranial identification and interpretation; offers suggestions for modern faunal analysts; and considers the methodological barriers that have led to this point.

Lane, Brian (University of Oregon)**[302]** *Defining Territories: Exploratory Analysis in Polynesia*

Territory boundaries can often be difficult to identify archaeologically despite their importance in understanding the larger population process of competition between groups in the past. This analysis tests our ability to define archaeological territories on islands based on geospatial relationships between resources and fortifications. Territories are the result of historical processes of competition between groups. Testing of this method is conducted for the island of Rapa, Austral Islands, French Polynesia. The island is an ideal location due to the importance of competition and territoriality in our understanding of the island's prehistory and the circumscribed nature of islands.

Lane, Brian [180] see DiNapoli, Robert J.

Lane, Kevin (CONICET—Instituto de Arqueología) and Jennifer Grant (CONICET—INAPL)**[238]** *Pastoralisms of the Andes: A Southern and Central Andean Perspective*

In this paper we contrast and compare the development of pastoralism at two opposite yet complimentary geographical locations with a focus on pastoralist impact on the environment. In Argentina we present the evolution and development of pastoralism (c. 3300–400 BP) in the arid highlands of Antofagasta de la Sierra, as societies negotiated the shift from hunter-gathering to a more mixed, but increasingly, pastoralist economy culminating in late complex agropastoralist adaptations. Similarly in the central Andes, we consider the enduring landscape modifications and transhumance patterns of complex agropastoralists located in Ica highlands (2100–400 BP) and their relationship with agricultural communities. In so doing, this presentation argues for the concept of the many, different and varied types of pastoralism present in the Andes; ranging from an early transhumant hunter-gatherer-horticultural pastoralism to a tethered, fully integrated agropastoralist model for the latter period. Adopting a political ecology approach we consider how human agency and an expanding pastoralist frontier have impacted on and developed landscapes. We thus consider changes and shifts in the landscape of resource areas, settlement location and concomitant herding patterns as well as human-induced alterations in pasture. Finally we focus on the wider implications of pastoralism in the development of Andean society.

Lane, Rachael (University of Sydney)**[76]** *Apples and Oranges? Positioning Regional Archaeology in a Global Perspective*

This paper focuses on issues and methodological approaches to the comparison of archaeological sites, scaling from a regional to a global perspective, with a specific focus on settlement archaeology. The key issue appears to be the logical difficulty of contextualizing regional culture historical data within theories of global settlement patterns. A secondary problematic issue related to the one aforementioned is in the comparison of datasets with highly variable integrity at both these scales, which adds to the difficulty of building viable comparative methodologies. Furthermore, the constraints on archaeologists conducting comparative research, arising from the non-standardization of data and practice within a globalized world are far from trivial. That said, the fact that archaeology is practiced differently all over the world resonates with Bruce Trigger's argument that archaeological theory and method generated in different social and national contexts is a more viable pathway toward understanding the past than is the formulation of a single coherent empirical archaeological theory, or the kind of general theory that David Clarke advocated in the 1970s. This paper also attempts to utilize the tension between Trigger and Clarke to investigate issues impacting global comparative research in archaeology now and in the future.

Lang, Jianfeng [287] see Wang, Qingzhu

Langdon, Steve**[380]** *Tlingit "Streamscaping" as Landesque Capital Formation*

The Tlingit heen sati ("stream master") was responsible for establishing and maintaining respectful relations with salmon as a trustee for his clan. The portfolio of obligations included both pragmatic duties controlling access and harvests and ritual responsibilities, such as greeting the arrival of salmon each year with welcoming ceremonies, practices anchored to the Salmon Boy mythic charter that identified the fundamental similarity of humans to salmon as persons. Another dimension of Tlingit interaction with salmon was the modification of in-stream features that was intended to accomplish different purposes through a variety of forms. The term "landesque capital" is a conceptual frame formulated to characterize landscape modifications among agriculturalists but is here utilized to examine the range of in-stream modifications developed by Tlingit through which to interact with salmon. It will be suggested that a particular form of landesque capital formation was motivated by Tlingit understanding of the "ish," a deep pool of slowly moving water in a stream, as a location of special importance to salmon as persons and beings. The long term consequences of in-stream modifications to create other features similar to the "ish" will be highlighted, particularly as related to increasing and regularizing salmon productivity.

Lange, Hans [144] see Darwent, John

Langley, Michelle (Australian National University), Sue O'Connor (Australian National University) and Jane Balme (University of Western Australia)**[173]** *Organic Artifacts and Organic Residues in Island Southeast Asia and Australia: Seeking Intangible Behaviors in the Deep Past*

Exploring intangible behaviors—such as the decoration of oneself, or the manufacture of clothing or baskets—in the deep past is often beyond the reach of archaeologists. The microscopic examination of use wear and residues, however, allows researchers to gain significant insights into such 'invisible' behaviors. Organic artifacts recently excavated from sites located in both northern Australia and Timor-Leste (Island Southeast Asia) were microscopically examined for use wear and residues, and resulted in the identification of early decorative traditions in each region. Shells artifacts from the sites of Jerimalai, Lene Hara, and Matju Kuru 1 and 2 in Timor-Leste represented the earliest shell beads in Southeast Asia and the earliest shell appliqués in Island Southeast Asia, while bone artifacts from Carpenter's Gap 1 and Riwi, Kimberleys, Australia, resulted in the identification of the earliest example of a personal ornament on the Australian continent. Such research demonstrates the power of use wear and residue research for examining some of the most remarkable aspects of early human communities.

Langlie, BrieAnna (Loyola University Chicago)**[285]** *Engineering an Ecosystem of Resistance: Late Intermediate Period Farming in the South-Central Andes (AD 1100–1450)*

In the fifteenth century, the Inca built the largest precolonial empire in the western hemisphere. In southern Peru near Lake Titicaca, an ethnic group known as the Colla violently resisted conquest by the Inca for several years. Because of their military prowess, the Inca named one quarter of their empire, Collasuyo, after this group. The Colla's ability to resist Inca subjugation was facilitated by their decentralized economy evident in their

construction and management of a new agricultural ecosystem. At the Colla hillfort Ayawiri, archaeological data indicate that the construction of terraces and the production of agricultural products were managed by kin groups. The terraces surrounding Ayawiri are irregular in form indicating no centralized authority oversaw construction. Furthermore, there is no irrigation system that would have required cooperation among farmers to manage the flow of water. This farming system provided households with economic autonomy that was resistant to incorporation into stable political forms, including the Inca Empire. The Colla were only integrated into the empire after they relocated from their hilltop communities atop terraced fields to valley-bottom towns. My case study provides key insights into the ways autonomous farming communities engineer ecosystems that can defy statecraft and resist integration into empires.

Langlitz, Meredith Anderson (Archaeological Institute of America)
[291] Moderator

Langlitz, Meredith Anderson [234] see Perez-Juez, Amalia

Lanoë, François (University of Arizona), Joshua Reuther (University of Alaska Fairbanks Museum of the North) and Charles Holmes (University of Alaska Fairbanks)

[47] *Mobility and Resource Exploitation during the Late Glacial in the Shaw Creek Flats (Eastern Beringia)*

The colonization of Beringia during the Late Glacial period (about 14,500–11,700 cal. BP) represents the first permanent settlement of the subarctic and provided a pathway to the colonization of North America. The Shaw Creek Flats and nearby middle Tanana river, in central Alaska, constitute the densest area of identified Late Glacial sites; these are generally characterized by low-density occupations and diverse technological complexes. Recent research suggests some of these sites were specialized, short-lived locations dedicated to a single or few activities. Based on the spatial association of artifacts and faunal remains, the site of Swan Point CZ4b is interpreted as a workshop related to the production of composite tools, and the site of Keystone Dune is interpreted as a camp related to hunting activities. Specialized sites can be seen as logistical forays oriented toward the exploitation of specific resources within a larger economic landscape. Logistical sites, along with other, more residential sites, provide insight as to the strategies of landscape use employed by Beringian people in the Shaw Creek Flats.

Lapeña, Queeny (University of California, Los Angeles) and Stephen Acabado (University of California, Los Angeles)

[198] *Resistance through Ritual Feasts: The Role of Domesticated Pigs (Philippine *Sus scrofa*) in Ifugao's Fight against Spanish Colonialism*
Successful resistance against a colonizing power involves effective martial organization and a complex polity. Due to violence and diseases, established polities in the Americas and the Philippines were devastated following Spanish conquest. Nevertheless, several groups have been documented as actively resisting conquest by establishing settlements in remote mountainous settlements. In the Philippines, scholars have suggested that Spanish conquest of the Magat Valley urged the Ifugao to strategically resettle in the Cordillera Mountains between AD 1600 and 1700. Shortly after, they adopted wet-rice agriculture and built extensive rice terraces. The subsistence shift was accompanied by an increase in the consumption of domesticated pigs, a pattern that we argue is associated with increased ritual feasting. The agricultural movement, hence, established a ranked society that awarded political power to individuals skilled in mobilizing the community. This paper argues that the ritual consumption of domesticated pigs in feasts was entangled in the maintenance of the ranked social order that emerged from Ifugao's resistance against Spanish conquest. In the Philippines and elsewhere in the globe, local interpolity conflict is linked with the expansion of ritual feasting. This investigation presents a case where feasts politically and economically consolidated previously dispersed Ifugao communities.

Lapham, Heather (University of North Carolina—Chapel Hill)

[385] *Black Bear Use through Time in the Southern Appalachians*

Historic accounts of Fort San Juan, a Spanish garrison built near the native village of Joara in the late 1560s in western North Carolina, inform us that chiefs from neighboring towns brought "meat and maize" to the soldiers on various occasions. Based on the high proportion of bear in the fort faunal assemblage, it seems likely that the foods gifted to the Spaniards included bear meat. A recent zooarchaeological study suggests that native peoples provisioned the soldiers with some prime bear meat and meat dishes in a prepared or partially prepared state. Thinking about possible sources of these provisioned meats, we review the archaeological record of black bears (*Ursus americanus*) in the southern Appalachian Mountains and adjacent Piedmont region of Virginia and North Carolina from the fifth through the seventeenth century to better understand Native American bear procurement and use. Differences among the sites in geographic location, occupation period, disposal methods, and other variables suggest changing patterns of bear use through time. We explore reasons for these patterns, and present a brief contextual study of bear remains from several sites to more clearly define the role of bear in ritual, mortuary practices, and subsistence within these communities.

[385] Chair

Lapp, Jennifer E.

[370] *Why Pacific Nicaragua Should Not Be Considered Mesoamerican during Prehistory*

During precolumbian times, it is well-known that the societies of Mesoamerica developed monumental architecture with a high level of complexity. During this same period, much if not all of lower Central America never achieved higher complexity other than that of chiefdom level. Honduras is the one major exception. While the societies of Nicaragua had similar gods and ceramics much of this can be explained through other means. The gods that were similar were "lesser" gods and not the main gods that the Mesoamerican groups held central to their beliefs. The ceramics utilized had some similar motifs, but were unique in their own right. This can be seen by the many studies that are coming out in the more recent years. The burials and settlement sizes were significantly different. It is believed that the settlers of Nicaragua during prehistory were a mixture of Mesoamerican and South American heritage. The various sites of Nicaragua illustrate the fact that precolumbian Nicaragua should be considered a group of its own.

Lara Barajas, Israel (INAH) and Fiorella Fenoglio (INAH)

[183] *Aspectos bioarqueológicos de los grupos prehispánicos del semidesierto queretano durante el Epiclásico*

El hallazgo y recuperación de los restos de un bulto mortuario que contenía el esqueleto de un individuo masculino permitió, dadas sus características, plantear la hipótesis de que se trataba de un cazador recolector que habitó en esta zona antes de la llegada de los grupos sedentarios a la región; para confirmar dicha hipótesis se realizaron diferentes fechamientos a los materiales arqueológicos de éste y otros contextos hallados en la zona. En esta ponencia se dará a conocer los resultados del estudio bioarqueológico, de la datación y trataremos esbozar las implicaciones socioculturales que estos resultados tienen para la comprensión de las sociedades que habitaron la región.

Lara Barajas, Israel [183] see Fenoglio, Fiorella

Larkin, Karin (University of Colorado at Colorado Springs) and Michelle Slaughter (Avalon Archaeology)**[193]** *Health Mecca of the West: The Archaeology of a Tuberculosis Sanatorium*

Eighty years ago, Cragmor Sanatorium in Colorado Springs was a celebrated asylum for wealthy tuberculars and one of the premier facilities in the West. The history of the sanatorium is colorful and perhaps legendary. It includes housing movie stars, Mafioso and millionaires in the 1920s to 1930s and later Navajo patients in the 1950s. Once it became part of the University of Colorado system in 1965, much of the original history was subsumed under the growing campus. This project seeks to recover some of the ephemeral features of the sanatorium that could help us put the history in context and better understand the fanciful stories that surround the sanatorium through the material culture. As part of a survey and inventory of the cultural resources of UCCS funded by the Colorado State Historic Fund, we identified, recorded and tested several features and sites associated with the original functioning of the sanatorium. Although this project is in the beginning phases, we illuminate institutional practices and failures as well as suggest alternative healing strategies employed by physicians and patients.

Larmore, Sean P. (ERO Resources Corp.) and Kevin P. Gilmore (HDR)**[339]** *On the Road to Becoming Apache: The Western Dismal River Culture at the Plains/Foothills Margin*

Discovery of new sites as well as the reanalysis of museum collections over the last 15 years has renewed focus on the Western Dismal River (WDR) culture, which we hypothesize represents the ancestral Apachean occupation of the western margin of the Great Plains and into the foothills and high country of the Rocky Mountains, AD 1300–1650. Once thought to represent the initial entry of ancestral Apache in the region during the initial Na-Dene diaspora from the north, this culture is now recognized as transitional between the Promontory Culture at Franktown Cave (AD 1180–1280), which represents the initial ancestral Apache entry into the area, and the later Eastern Dismal River culture (AD 1650–1725) of the Central Plains. A decrease in regional population possibly related to climate change could have provided an advantage to WDR people who were adapted to marginal upland environments. The technology and material sources represented in WDR material culture reflects both familiarity with their environment born of long tenure and reciprocal trade relationships resulting in the exchange of raw material and ideas with groups in the Southwest and Great Plains. This intermediary role between the Plains and the Southwest represents the early stages in historical Apache ethnogenesis.

Larsen, Frederik [144] see Walls, Matthew

Larson, Griffin [11] see Stanyard, Zachary

Lash, Ryan (Northwestern University)**[157]** *Pilgrims and Pebbles: The Taskscape of Veneration on Inishark, County Galway*

This paper explores how a relational approach centered on the concept of taskscape could reinvigorate analyses of how pilgrimages create, sustain, or transform human-environment relations. Medieval and modern traditions of pilgrimage in Ireland are renowned for their engagement with 'natural' places and objects, such as mountains, springs, and stones. Some take this focus as evidence of an animistic pre-Christian heritage, but few have questioned how such practices structured peoples' ideas and interactions with the environment in Christian centuries. Eight years of research on the island of Inishark, County Galway has brought to light an early medieval pilgrimage landscape in which many shrine monuments acted as the foci of veneration and the deposition of water-rolled pebbles, including both decorated and undecorated pieces. Interweaving archaeological, textual, and folkloric evidence, I investigate the gathering, curation, and embodied interaction with pebbles in the context of contemporary processional rituals and cosmology. Considering the taskscape of human and nonhuman actions that brought pebbles to shrines suggests how the experience of pilgrimage afforded ideas of divine creation, reinforced notions of sacred hierarchy, and sustained monastic agricultural regimes.

Lassen, Robert (Gault Project at Texas State University) and Erin Keenan Early (Gault Project at Texas State University)**[345]** *Radiocarbon Dating at the Gault Site: A Case Study in Collaboration between AMS and ZooMS to Analyze Promising Faunal Samples*

The Gault site is a lithic procurement site and campsite in Central Texas with components ranging from earlier than Clovis to the Late Prehistoric. For the most part, absolute dating at Gault has relied on optically stimulated luminescence (OSL), which has a high standard error. AMS dating on sparse charcoal samples has been conducted as well, but with mixed results. In particular, the charcoal from the Clovis and lower strata failed to yield viable radiocarbon dates. While faunal preservation tends to be poor, the degree of preservation varies from sample to sample. Recent research by Harvey et al. (2016) indicates that ZooMS (zooarchaeology by mass spectrometry) can be used to screen bones for suitability for radiocarbon dating. By considering a combination of m/z range and minimum number of peaks, the peptide mass fingerprinting technique is purported to determine whether collagen preservation is sufficient for AMS dating. This project therefore seeks to assess the viability of this new screening methodology in different taphonomic conditions than those of Harvey et al., with the ultimate hope of gaining valuable collagen-based dates for the earliest components of the Gault site.

Latham, Katherine (University of Alberta)**[127]** *Working Like Dogs: A Systematic Evaluation of Spinal Pathologies As Indicators of Dog Transport in the Archaeological Record*

The use of dogs to pull or carry loads is well documented in the recent and historic past, but the origins of these working relationships are not well understood. Although it is likely that humans utilized dogs for transport activities in the prehistoric period, there is no clear archaeological evidence of dog transport until the historic era. Some archaeologists have suggested that pulling or carrying loads leaves unique signatures of stress on the skeletons of dogs. The use of skeletal indicators for identifying archaeological dogs is problematic because none of the indicators proposed have been systematically evaluated in known transport dogs or in dogs and other canids not engaged in transport activities. Without such data it is unclear if it is appropriate to attribute these skeletal abnormalities to specific occupational etiologies. This paper presents results from a large scale study of modern dogs and wolves that evaluates the occurrence of two spinal pathologies previously used as indicators of dog transport. These pathological lesions are spondylosis deformans and bent or twisted spinous processes. The goal of this study is to test the reliability of these pathologies as indicators of dog's involvement in transportation, including burden carrying and sled pulling.

Latimer, Bruce [338] see Hershkovitz, Israel

Latimer, Bruce [338] see Sarig, Rachel

Latinis, Kyle [333] see Ea, Darith

Latorre, Claudio [134] see Gayo, Eugenia M.

Lattanzi, Gregory (New Jersey State Museum)

[4] *Getting to the Source: Copper Characterization, Prehistory, and the Question of Interpretation*

One cannot truly “source” the raw material of an artifact back to its geologic origin. One can chemically characterize an artifact's raw material to a degree, to make an interpretation as to its likeliest point of origin. As we are dealing with a completely heterogeneous material—copper—archaeologists can only best guess the likely geologic source for the cultural artifacts they are testing. The chemical differentiation of distinct geologic deposits of native copper has been well established, but the same cannot be said for artifacts made from copper. Archaeologists involved in chemical characterization studies use different protocols, laboratories, machines, and different standards. Specific elements and isotopes are purposefully chosen for our analyses, and the results are then subjected to rigorous statistical analyses. The data are then presented in such a way that the archaeologist interprets them as highly likely to have originated from a specific geologic source. This presentation discusses the basic assumptions of chemical characterization, how as archaeologists we must be careful in our interpretations of the data, and how there should be some common protocol for the future of prehistoric copper studies.

Lattanzi, Gregory [4] see Hill, Mark

Lau, Hannah (UCLA)

[244] *Experimentations in Social Complexity: The Halaf Period and Evidence from Domuztepe*

The Late Neolithic Halaf period (c. 6100–5200 cal. BCE) is one of critical importance for understanding the emergence of social complexity in the Ancient Near East. During this period, people in Northern Mesopotamia were beginning to experiment with altering the scale at which their social, economic, and political networks were structured. By examining gradual shifts in the scale of cooperation within groups, we can identify changes in social interaction and organization. I demonstrate this using evidence of Halaf peoples' agropastoral production systems and of large-scale feasts at the Halaf site from the site of Domuztepe (ca. 6000–5450 cal. BCE) in southern Turkey. Evidence of cooperation and emergent inequality at Domuztepe correlates with evidence from the broader Halaf region of cooperation and coordination in raw material procurement, craft production, and accounting practices. Together these data indicate that at Domuztepe, and perhaps at other population centers during the Halaf period, people began to experiment with new forms of social integration and organization.

[244] *Chair*

Laue, Cheyenne (University of Montana)

[38] *Environmental Variation and Technological Change: Results of an Agent-Based Simulation*

Computer modeling is an increasingly important aspect of evolutionary anthropology and archaeology. Computer models of change in cultural and technological forms are often highly revelatory of the ways in which large-scale evolutionary patterns arise from the local interactions between individuals. As such, the results of these models may have broad implications, both within the anthropological sciences and without. This paper details simulation results from an agent-based model of cultural evolution that focuses on the processes of technological innovation and diffusion. In particular, the model discussed here examines the emergence of different technological strategies in the context of spatial structuring and environmental variation. Drawing from both population genetics and cultural evolutionary theory, this model is oriented around previous work on evolutionary dynamics and parameters such as cultural selection and drift, and population size and density. Model results are discussed in the context of current archaeological understandings of the relationship between technological complexity, specialization, and environmental change.

Lauer, Adam (University of Hawaii at Manoa), Stephen Acabado (University of California, Los Angeles), Chin-hsin Liu (California State University Northridge) and John Krigbaum (University of Florida)

[198] *Health and Nutritional Stress in Pericolonial Ifugao, Philippines*

The Ifugao of the highland Philippines responded to Spanish colonial incursions in adjacent lowland towns in the early 1600s by consolidating their political, social, and economic resources. This period saw the introduction of wet-rice agriculture and subsequent expansion of irrigated terraced agriculture in the region. These social and economic changes suggest an increased reliance on rice and a decreased dependence on a broad-spectrum diet. It is hypothesized that changes in diet and larger population density would be reflected in deteriorating health of the population. For this study 23 fetal to early juvenile (24 months) skeletons and teeth as well as the fragmentary teeth and skeletons of six adults recovered from the Old Kiyangan Village site were analyzed for health and diet data, including a subset analyzed for light stable isotopes. Adult are generally healthy. Fetal and subadult health indicate maternal nutritional stress during gestation as well as nutritional stress and the possibility of trauma in the first years of life. These patterns are stable through time, from before the Spanish colonial incursion through the abandonment of the village. Light stable isotope analyses also find that the diet remained relatively steady throughout the time period of intensifying wet rice production.

[198] *Chair*

Lauer, Adam [284] see Liu, Chin-hsin

Laughlin, Tyler (Texas A&M University) and Anna Dean (Texas A&M University)

[341] *Analysis of a Late Archaic Hearth Feature at the Debra L. Friedkin Site in Central Texas*

The Debra L. Friedkin Site (41BL1239) near Salado, Texas, is the oldest known, continually occupied site in North America. While the previous focus of excavations and analyses at the Friedkin Site has been on Paleoindian strata, this site also has extensive early and late Archaic components, and recent excavations in 2015 and 2016 uncovered a 3 m × 5 m series of five overlapping hearth features in the late Archaic strata (14C 4000–1250 BP). Projectile points, tools and organic materials such as bone and charcoal were recovered in and around these features, creating an assemblage from which multiple dates can be derived. Through a spatial analysis of projectile points and radiocarbon dating, this complex hearth feature provides the opportunity to better understand not only the site formation processes of the Friedkin site, but also the occupational chronology of the late Archaic Period of central Texas.

Laurila, Erick [301] see Terlep, Michael L.

Laurin, Gina [191] see Milligan, Jennifer

Lausanne, Alexandra (University of Victoria), Daryl Fedje (University of Victoria), Quentin Mackie (University of Victoria) and Ian Walker (Arizona State University)

[49] *A Multi-Method Approach to Prospecting Stranded Paleo-Coastal Sites on Quadra Island, British Columbia*

Despite increasing support for the first peopling of North America via a coastal route, only a limited number of postglacial (Late Pleistocene–Early Holocene) archaeological sites have been identified on the Northwest Coast. This research aims to identify high potential locations for evidence of the Early Period archaeological record (pre-10,000 cal BP) on Quadra Island, BC. Quadra Island has experienced dramatic sea level regression over the past 14,000 years following the Last Glacial Maximum. These (now inland) paleo-shorelines represent key areas for archaeological prospecting. Through a multi-method approach using sea level history, LIDAR and GIS modeling techniques, prospection for stranded paleo-coastal sites can be greatly improved. LIDAR and GIS modeling are up-and-coming technologies in Northwest Coast archaeology. Using the local sea level history with LIDAR allows detailed “bare-earth” visualizations to be created and reveals hidden archaeological and paleo-coastal features. These features, such as inland paleo-shorelines, can be remotely targeted from beneath the rainforest canopy for archaeological foot survey. Through integration of these technologies into a multi-method prospection approach, time and effort during fieldwork can be maximized, and archaeological site identification can be increased.

Lavi, Noa [193] see Lew-Levy, Sheina

Lavi, Ron (Manot Cave Project) and Lauren Davis (Ben Gurion University)

[338] *The Stratigraphy of Area E, Manot Cave*

Area E is located close to the upper end of the main talus, at the NW side of the cave. It is built of sediments which originated outside the cave, mainly the local Terra-Rossa soil that was washed into the cave with rainwater, mixed with limestone rocks, some of them originating in the cave itself from decaying and falling roof and wall parts. Two main sedimentary units were observed so far: Unit 1—Colluvium made of soil with limestone rocks in varying sizes. This colluvium contains very little to no archaeological finds at all, and only a small amount of bones of bio-origin, namely hyenas’ activity. Unit 2—Colluvium made of soil with limestone rock, usually of small to medium size. This colluvium contains abundant archaeological material. Within Unit 2, at least nine separate archaeological layers were detected, consisting of horizontal accumulations of flint items, splintered bones, bone and antler tools, shells, art objects, and combustion features, namely hearths and ash accumulations. These archaeological accumulations are separated by soil containing very little archaeological material. Some of the accumulations are up to 15 cm thick. Possible human-made stone features were also detected in Area E.

Lavier, Catherine [62] see Horta, Helena

Law, Karly

[360] *Oregon Tribal Historic Preservation Offices: Problems and Challenges of Starting and Maintaining a THPO*

In 1992, amendments were made to the National Historic Preservation Act (NHPA) to include provisions for Indian tribes to assume the responsibilities of the State Historic Preservation Officer (SHPO) on tribal lands, and establish the position of a Tribal Historic Preservation Officer (THPO). THPOs are responsible for conducting a comprehensive survey of tribal historic properties and maintaining an inventory of such properties, preparing and implementing a tribal-wide historic preservation plan, and assisting federal agencies in the NHPA Section 106 review of undertakings on tribal land. There are a total of nine federally recognized tribes in Oregon, of which six having a federally recognized THPO, and two agreeing to participate: the Confederated Tribes of Grand Ronde and the Cow Creek Band of Umpqua Tribe of Indians. The goal of this research is threefold: to understand the challenges that these tribes faced when they first began the process of creating their THPO, to find ways to make starting and operating a THPO less of a challenge, and to understand how they measure success (i.e., budget size, staff size, educational outreach, etc.).

[360] *Chair*

Law Pezzarossi, Heather (Syracuse University)

[159] *Visualizing Nineteenth-Century Nipmuc Landscapes*

The Nipmuc people once lived seasonally mobile lifestyles among the lakes, rivers and hills of what is now Central Massachusetts. Colonial encroachment affected this lifestyle greatly, at first in the form of policed and restricted mobility and pressure from the colonial government to own and farmland in severalty, and then later, in the late eighteenth and early nineteenth centuries, the Nipmuc community was largely dispossessed of their land by surrounding Euro-American farmers. As a result, the nineteenth-century Nipmuc community was widely dispersed across Central Massachusetts, living on land they did not own, renting in the city and on larger farms in the countryside. They tended to move often, rarely leaving much documentary evidence of their dwelling history. These events have contributed to an inadvertent narrative of disappearance and erasure that poorly reflects the continued occupancy of the Nipmuc community on the New England landscape. In this paper, I use GIS as a tool to visualize the New England landscape as an Indigenous community space in the nineteenth century, regardless of its ownership, divisions and transformations at the hands of Euro-American settlers and the difficulties, past and present, inherent in representing Native spaces with Western style maps.

Lawler, Brooks (University of Alaska Fairbanks)

[257] *Preliminary Insights into Prehistoric Toolstone Preference of Two Igneous Materials in the Tanana River Drainage, Interior Alaska*

This project examines prehistoric human mobility and raw material preference for tool manufacture in the Tanana River Drainage, Interior Alaska. A geographic approach is used to investigate the distribution of prehistoric obsidian and rhyolitic artifacts in relation to the sources of these materials. The objective of the investigation is to reveal spatial patterning in the distributions of artifacts made of these two materials, relative to each other and relative to the cost of obtaining these raw materials from their sources on the landscape. My initial hypothesis based in human behavioral ecology and optimal foraging theory, stated if prehistoric hunter-gatherers acted to optimize their energy expenditure they could be expected to favor raw materials with the lowest cost of acquisition. The frequencies of different raw material types are examined for thirty-five sites with artifact assemblages that have identified source groups. Those frequencies are compared with geographic information systems models of travel cost. The results of the analysis suggest that the hypothesis does not represent a complete picture of prehistoric human behavior. A more realistic model of human behavior was hypothesized from additional analyses, such that prehistoric hunter-gatherers may have exploited certain material opportunistically and seasonally.

Lawrence, Dan [118] see Hammer, Emily

Lawrence, Ken (SWCA-Texas State University), Charles Frederick (Consulting Geoarchaeologist), Arlo McKee (University of North Texas), Charles W. Koenig (Texas State University) and Stephen L. Black (Texas State University)

[126] *The Paleoindian-Age Deposits of Eagle Cave: Preliminary Impressions*

One of the fundamental research questions of the Ancient Southwest Texas project was to determine if there was Paleoindian occupation of Eagle Cave. Excavations during the 2016 field season explored the Paleoindian age deposits and revealed tantalizing evidence of human presence at that time. One clear occupation was revealed (discussed in another presentation in detail by Castañeda et al.) but beneath this were several deposits that appear to be decomposed fiber beds which are associated with a low density of artifacts. This presentation discusses the Paleoindian-age sediments and their archaeological implications.

Lawres, Nathan (University of Florida, Department of Anthropology)

[377] *Relationality, Circularity, and Monumentality: Ontological Materializations in the Belle Glade Monumental Landscape*

The Belle Glade monumental landscape exhibits a high level of monumentality, with architectural features ranging from large circular ditches to massive geometric arrays of earthen architecture. However, this unique architecture has seen few archaeological interpretations. Those that have been put forth have largely emphasized economic explanations, many of which have been refuted with the acquisition of new archaeological data. Additionally, recent ecological studies show that the physical landscape itself was much different than previously envisioned. These studies make it apparent that this was an aqueous landscape subject to water flowing across its entirety for nine months of the year. Much like the physical landscape they are a part of, the Belle Glade monuments are also unlike anything else in North America. I argue that in order to comprehend the architecture of this landscape we need to shift our line of thought away from thinking of these features as strictly functional architectural elements and envision them as monuments that embody the alterity of the landscape itself. By engaging the ontological turn of anthropology I will show how the Belle Glade people materialized their ontology in monumental form by embodying the relational elements of their landscape in architectural form.

Layco, Wendy (California State University Los Angeles) and Madeleine Yakal (UCLA)

[355] *Beads Associated with Infant Jar Burials/Supine Child Burials: Evidence of Social Inequality in Early Ifugao Culture*

Beads have been used as social markers in many Southeast Asian cultures. The Ifugao Archaeological Project excavations conducted between 2011 and 2012 recovered beads associated with infant jar burials at Old Kiyangan Village, an early Ifugao site in the Philippines. Preliminary analysis shows that prestige beads were concentrated in burials located near the center of the village. Case studies from Southeast Asian sites in Thailand and Cambodia show similar distributions of material types and locations, allowing inferences about social ranking. The concentration of nonlocal goods suggests social ranking was in effect during the occupation of Old Kiyangan Village and, therefore, the precolonial social structure of Ifugao was stratified before European contact.

[355] *Chair*

Laycock, Joseph (Texas State University)

[212] *Discussant*

Lazcano Arce, Carlos (Coordinación de Humanidades-UNAM) and Marianne Sallum (University Sao Paulo, Brazil)

[215] *Work and Specialization in the Epiclassic Period (650–950 CE) at Xochitecatl-Cacaxtla, Tlaxcala*

During the Epiclassic Period (650–950 CE) was the peak of Xochitecatl-Cacaxtla. It became the most important center in the Puebla-Tlaxcala Valley. There were numerous small groups who vied for a place in the landscape after the fall of Teotihuacán in the central highlands. There was a clear hierarchical division, as the society was formed by the elite, priests, and groups of peasants. The artisans were different specialists whose work allowed for the biological and social reproduction of “asentamiento” and whose activities involved the exploitation of various natural resources.

Láznicková-Galetová, Martina [127] see Germonpré, Mietje

Lazrus, Paula Kay (St. John's University)

[336] *Landholdings and Social Standing: Land Use in the Territory of Bova, Calabria, in the early 1800s*

Spatial analysis of land-use data from Napoleonic era Cadastral records provides a window into the social and economic status of individuals in the town of Bova (Calabria, Italy) during the post-Medieval period. Using GIS to explore the cadastral records and archaeological evidence from field survey conducted by the Bova Marina Archaeological Project, this study explores how economic strategies and social relations in this community located in the foothills of the Aspromonte is reflected in the types of crops grown, their position within the landscape and the number and size of holdings. Access to better drainage, roads and rural housing is addressed as a way of understanding the economic and social dynamics of a community that had been a feud of the Archbishop of Reggio and where the church still had much influence even 20 or more years after the official end of feudalism.

Le Bailly, Matthieu, Nicolas Goepfert (CNRS-Paris 1, UMR 8096 Archéologie des Amériques.), Gabriel Prieto (Proyecto Arqueológico Huanchaco, Universidad Nacio) and John Verano (Tulane University, New Orleans, USA)

[238] *Gastrointestinal Parasites of the Camelids of the Archaeological Site of Huanchaquito (Peru): First Results*

The health status of domestic camelids is an original research topic in the past Central Andes. The discovery of more than 200 well-preserved camelids in Huanchaquito in the northern coast of Peru was the opportunity to perform paleoparasitological analyses on 20 samples taken from preserved intestines and faeces recovered during the excavations. Extractions of the parasites using RHM standard protocol raised to the observation in 55% of the samples of several helminth taxa belonging to the orders of Trichocephalida and Echinostomida. In addition, 45% of the studied individuals tested positive to coccidian (protozoa) belonging to the Eimeriidae family. Size of the oocysts showed important variation probably due to the presence of several species. Four *Eimeria* sp. species are known today by camelids, among which *E. macusaniensis*, potentially lethal for llamas. This new data shows the high level of infection of camelids and brings new perspectives on the herd health status, the living conditions of these animals, and the Chimú herding practices.

Lea, Sheridan (Dept. of Anthropology, Vanderbilt University), Natasha P. Vang (Dept. of Anthropology, Vanderbilt University) and Tiffany A. Tung (Dept. of Anthropology, Vanderbilt University)

[233] *Rural Life during and after the Fall of the Wari Empire: A Stable Isotope Analysis of Childhood Diet and Geographical Origins at the Village of Qasa Pampa, Ayacucho, Peru*

Life in a rural village can be vastly different from life in the metropolis, and when an empire collapses the effects can reach even the smallest village. For Qasa Pampa, an agricultural village that was occupied in Wari (ca. 650–850 CE) and post-Wari (ca. 1000–1200 CE) times and located several

kilometers away from the capital of Huari, life for its population may have been quite distinct from their capital counterparts. Stable carbon and oxygen isotope analysis can shed light on the dietary habits and geographic origins of Qasa Pampa inhabitants, respectively, both during and after the collapse of the Wari Empire. From the reconstruction of these dietary habits pre- and post- collapse, we aim to understand the impacts of imperial policies and practices on daily life of a lesser village, and also how that lifestyle was altered after the collapse. Results show that carbon enriched foods, likely maize, were consumed in high quantities during childhood throughout the whole occupation (mean $\delta^{13}\text{C}$ from tooth enamel = -5.8‰ ; $N = 31$ enamel samples). The mean $\delta^{18}\text{OVPDB} = -9.2\text{‰}$ (s.d. = .9) and the stable oxygen values range from -11.7 to -7.7‰ , suggesting that there might be nonlocal individuals interred at Qasa Pampa.

Lea, Trevor [303] see Arakawa, Fumiyasu

Leach, Peter (Department of Anthropology, University of Connecticut) and Brian Robinson (Department of Anthropology, University of Maine)
[186] *Consumer-Grade Drone Mapping and Centimeter-Level Intertidal Geomorphic Changes at the Seabrook Marsh Site, Hampton, New Hampshire*

The Seabrook Marsh site [SBM] in Hampton, New Hampshire is a ca. 3500–4500 BP multicomponent site beneath 1–2 m of salt marsh peat and exposed at a rapidly eroding shoreface. Like most intertidal archaeological sites SBM occupies a dynamic environment. Daily tidal fluctuations slightly modify surficial sediments, but on a monthly, seasonal, or annual scale the magnitude of changes is quite significant. The resulting landscape modifications range from minor erosion and deposition to catastrophic failure of shoreline elements through undercutting and rotational slumping. To quantify ongoing erosion at SBM we used a consumer-grade drone and with three surveys recorded 12 months of intertidal geomorphic changes at 6-month intervals. Photographs were collected at 10 m altitude within 1 hour of low tide. We then used digital photogrammetry software to create orthophotograph mosaics and digital elevation models [DEMs]. Our data exhibited roughly 8 mm resolution and were sufficient to resolve bootprints and minuscule features in DEMs. Data processing in ArcGIS ensured exceptional spatial congruity between surveys. GIS-based spatial comparisons resolved centimeter-level intertidal sediment dynamics and landscape alterations. These data provided a high-resolution assessment of critical areas at SBM that will be the target of upcoming excavations.

Leach, Peter [262] see Singer, Zachary

Leader, George (University of Pennsylvania), Aylar Abdollahzadeh (University of Pennsylvania), Sam Lin (University of Wollongong) and Harold Dibble (University of Pennsylvania)

[40] *The Effects of Exterior and Lateral Platform Morphology and Raw Material on Flake Size and Shape: Results from New Controlled Experiments*

Previous controlled experiments have illustrated that exterior platform angle and platform depth have a strong influence on the size and shape of a flake. Using specially made cores and a hydraulic knapping machine we present results from two new controlled experiments. The first of these involves altering the exterior and lateral margins of the platform and seeing the effects these changes have on flake mass in relation to platform depth. In the second controlled experiment, glass cores (which were used in all of our previous experiments) are replaced with cores made from basalt, obsidian and flint. In this experiment, the emphasis is on the amount of force required for the removal of flakes from each raw material in relation to platform depth. The results from both experiments have important implications for the prediction of flake size based on these important independent variables.

Leary, Jim (University of Reading)

[168] *Discussant*

Lebovich, Liat (University of North Carolina at Greensboro), Victoria P. Johnson (Department of Anthropology, New York University), Ryan M. Byerly (Far Western Anthropological Research Group), Cynthia M. Fadem (Department of Geology, Earlham College) and Charles P. Egeland (Department of Anthropology, University of North Ca)

[152] *Taphonomy of a Modern Landscape Bone Assemblage in the Ngorongoro Conservation Area, Tanzania*

Bone assemblages from modern landscapes can help address a variety of issues, from the degree to which bone scatters accurately reflect local habitats to what variables condition the deposition, preservation, and spatial distribution of faunal material. In 2015, systematic pedestrian survey recovered ~350 bone specimens within a 200 m × 200 m area of open grassland about 2 km north of Olduvai Gorge in the Ngorongoro Conservation Area (NCA). Weathering profiles suggest an exposure, and thus accumulation, time of many years. Find density is well under one bone specimen per square meter, although spatial analysis reveals significant clumping. The findings from the NCA “background scatter” are used better understand the paleoecology and taphonomy of Olduvai Gorge’s well-known early Pleistocene faunal assemblages.

LeBreil, Emilie (Oakland University) and Geoffrey McCafferty (University of Calgary)

[326] *About Face: A Head-On Examination of Precolumbian Social Identity*

A desire for art to reflect social identity is made apparent through prolific representations of human faces in precolumbian ceramics. The ceramic art of Greater Nicoya and the surrounding regions demonstrates an intrinsic drive to communicate distinct group characteristics and illustrates the importance of individuals’ bodies as instruments of both personal expression and social relationships. Physical expressions of collective identity foster a sense of belonging and satisfy the human desire for order and social organization in everyday life. External decoration and modification, hairstyle, tattooing, jewelry, and garment design are all important elements of both self and group identities. These varieties of ornamentation ultimately convey the importance of physical appearance as a device to communicate distinctive group traits. This paper seeks to decode the complex social messages conveyed by human faces on ceramic vessels and figurines from Greater Nicoya and neighboring areas. By gaining a better understanding of social identity through depictions of human faces in ceramic art, we can begin to understand more of the complex social messages and shared ideals of the enigmatic indigenous groups of Greater Nicoya and its neighboring regions.

Lechleitner, Franziska [162] see Baldini, James

Leclerc, Natasha (Memorial University of Newfoundland)

[223] *Shellfish, Seasonality, and Subsistence in Sechart Inlet: Understanding Intertidal Resources with High-Resolution Bivalve Sclerochronology*

This paper presents the results of annual growth pattern analysis and geochemical analysis of live-collected and archaeological shells from the Sechart Inlet, southern British Columbia. Annual growth line analysis of butter clams (*Saxidomus gigantea*) from three sites in this region revealed an intensive

pattern of shellfish collection relative to other large village sites on the Pacific Northwest Coast. This variability suggests there may also be differences in seasonal collection patterns. To understand seasonal harvesting practices we analyzed live-collected and archaeological shells to ensure precise seasonality estimates through high-resolution stable oxygen isotope sclerochronology (combined analysis of growth patterns and stable oxygen isotopes). Salinity values in this region were measured at ~15 PSU during the summer months, lower than other previous calibration studies. This lower salinity regime must be considered when inferring seasonality from geochemical data because of the opposing effects of temperature and salinity on stable oxygen isotope values. We also analyzed live-collected littleneck clams (*Protothata staminea*) to evaluate if this species can also be used as a reliable indicator of shellfish harvest intensity and seasonality. Combined with faunal data, we develop a nuanced understanding of seasonal subsistence practices in the Sechelt Inlet over 5,900 years.

[223] Chair

Leclerc, Mathieu [302] see Reepmeyer, Christian

LeCount, Lisa (University of Alabama)

[21] Discussant

LeCount, Lisa [274] see Simova, Borislava

Ledford, Janine (Makah Cultural & Research Center)

[295] Discussant

Ledford, Kelly (Florida State University) and Tanya Peres (Florida State University)

[340] *Constructed Spaces and Managed Species: Niche Construction Theory and "Wild" Turkey Management during the Mississippian Period in the Southeastern United States*

Precolumbian peoples of the Southeastern United States systematically altered their environment through forest clearing, gardening, terraforming, and urban planning. The end result of these activities encouraged certain native animals like the wild turkey (*Meleagris gallopavo silvestris*) to occupy these constructed and managed environments, especially forest-edges and agricultural fields. The sustained daily interactions between species resulted in a special and complex human-turkey relationship. In some areas of the Americas the end result is evidenced as domestication, while in the Southeastern United States, a unique style of free-range turkey management was in place by at least AD 1250. Working from the theoretical basis of niche construction theory, we bring together the ethnographic and ethnohistoric record of Southeastern Native Americans, biological literature on wild turkeys, and morphometric data from a Mississippian Period (ca. AD 1250–1450) archaeological turkey assemblage to present a more nuanced understanding of the cultural engagement of a not-so wild species.

Ledin, Lauren (University of Chicago) and Hongbin Yue (Institute of Archaeology, Chinese Academy of Social Sciences)

[72] *Foundations of Childhood: Bioarchaeology of Subadults at the Late Shang Capital of Yinxi*

Oracle-bone inscriptions and pre-Han texts say little about children, making bioarchaeology the best available method to study childhood during earlier periods. In 2004, extensive excavations were carried out on building foundations in Dasikong Village, a Late Shang (c.1200–1046 BC) lineage neighborhood found on the outskirts of modern-day Anyang, Henan Province, China. This led to a uniquely high recovery of subadult remains as younger subadults are often found in and around foundations. For this paper, the age, biological sex, and mortuary contexts of 49 of the subadult individuals were reassessed to explore whether a child/adult binary and later conceptions of childhood are suitable descriptions of the role of Late Shang subadults. Surprisingly, artifacts traditionally considered adult proxies of power were interred with individuals as young as 10–12, suggesting the age group assumed for adult roles should be expanded to include individuals under 15. Patterns in grave good type and number, mortuary treatment, and skeletal age additionally suggest that the current understanding of a child/adult binary is not an effective way to grasp the social identity of Late Shang subadults. In this paper we propose instead that Late Shang subadults passed through a number of socially recognized stages reified in mortuary treatment.

Ledogar, Sarah (University at Albany–SUNY) and Jessica Watson (University at Albany–SUNY)

[248] *Testing the Effectiveness of 2D Morphometric Data for Identifying Species in Galliformes*

Galliformes, or game birds, are one group of birds commonly utilized by prehistoric people that are particularly difficult to classify beyond family. In addition, bird bone assemblages are often fragmentary and poorly preserved, making avifauna notoriously difficult to identify to species, even by trained specialists. Nonidentified bones lead to a decrease in information available about taxa present at the site, hunting preferences of the site inhabitants, environmental conditions, and other issues commonly studied by archaeologists. In this paper, we examine a series of skeletal morphometric traits in 12 gallinaceous species from North America and Europe to determine the range of shape and size variation among these species using principal component analyses. We also test whether the use of morphometrics can enhance the classification of Galliformes using discriminant function analyses. We ask: How can we differentiate between species with bones alone? Can bone measurements discriminate beyond family to species or genus in Galliformes? How effective are morphometrics for zooarchaeologists?

[248] Chair

Lee, Boyoung (University of Oxford), Mark Pollard (University of Oxford, Research Laboratory for Archaeology) and Holger Kramer (University of Oxford, Department of Physiology, An)

[96] *Proteomics for Silks: Identify and Distinguish B. mori and Other Species*

Silk fiber generally known is made from a species called *Bombyx mori*, which was domesticated about 2,000 years ago in China. This is reared by human and the process is called sericulture. However there are other wild silk species that are not domesticated but still used in textile making. In an archaeological context, the proof of sericulture could be an index of the cultural and technological development of a location: it implies that there was a developed economy to import or produce silk—and in latter case also had the knowledge and technology to do so. To know what it is and where it came from is an integral part of the process. However, so far in textile analysis, identification of different species of silks has not been attempted due to the limitation of knowledge and method. Thus in study, it aims to adopt proteomics technique to identify and distinguish *B. mori* and other wild silks, even from historical and archaeological samples. The results from peptide identification using LC-MS/MS and MALDI-TOF from 7 different species of silks were promising. This would suggest a solution to the current disputes over early silk findings and the settlement of silk-making industry and technology.

Lee, Christine

[276] *Conservation Recommendations for Human Skeletal Remains Excavated from Desert Oases, Cave Shelters, and Permafrost in China and Mongolia*

Tomb excavations have been documented in East Asia for over 100 years, however the focus has been on artifact collection. The systematic excavation and collection of human skeletal remains is new to this region. This study will outline three cases where there was a demonstrated need for the implementation of conservation techniques. The first case included several naturally mummified skulls from Xinjiang, Province, China. A graduate student had decided to wash the skulls to remove skin and hair. A month later white crystals were seen growing out of the skulls. The second case involved four naturally mummified cave burials from southwestern Mongolia. Once removed from the dry environment, they began to decompose again. The last case was excavated from permafrost in northern Mongolia. After the tombs were opened, it began to rain inside from the melting ice. The skeletons were bagged in plastic and stored in cardboard boxes for a year before the author examined them. When examined all of the bones were coated in white mold. This study will give recommendations for the treatment and storage in these particular cases.

Lee, Gyoung-Ah (University of Oregon)

[24] *Chair*

Lee, Gyoung-Ah [24] see Lee, Hyunsoo

Lee, Hyunsoo (University of Oregon) and Gyoung-Ah Lee (University of Oregon)

[24] *Neolithic Resource Use and Niche Construction on Jeju Island, Korea*

One of the key subjects in island archaeology is how islanders adapted to isolated environments and sustained with local resource. Jeju Island sites reveal Early Holocene Neolithic settlements, dating 2,000 years prior to any of Neolithic sites in the Korean mainland. Accordingly, Jeju Island offers an opportunity to understand any shift in subsistence strategies amid the changing Early Holocene environments. A sudden appearance of arrowheads and grinding slabs in the Early Holocene Jeju has been often interpreted as evidence for an increasing importance of edible flora and terrestrial games. This trend may link to worldwide transition to the broad-spectrum subsistence transition. Such a hypothesis has not been tested due to a lack of archaeobotanical studies in Jeju. Our project will investigate both macroscopic and microscopic plant remains in Neolithic sites on Jeju along the coast and uplands. We aim to compare resource utilization among the Korean mainlanders and Jeju islanders and to develop a model on diverse niche construction in Korean Neolithic period.

Lee, Jinok (University of Texas, Austin)

[33] *Neolithic Human-Landscape Interactions in Eastern China: Preliminary Results from Liangchengzhen*

Cultural trajectory of the Yellow River catchment is characterized as complex and integrated feedback process of environment-landscape-human interactions. Landscape history of the Neolithic site, Liangchengzhen, provides a good example of prehistoric agricultural land use and its impact on local landscape, as well as how the human-landscape process possibly affected rapidly increasing social complexity during the Longshan period and subsequent hiatus in eastern China. Through a combination of geomorphological and microbotanical studies of on- and off-site landscapes of Liangchengzhen, evidence has been identified for local landscape history, including erosion of hill slope soils and redeposited soil layers containing rice phytoliths dating to the middle-late Longshan period. This finding provides evidence for late Neolithic rice farming strategies utilizing natural wetlands and redeposited soils. Sediments from subsequent periods, however, revealed evidence for a massive alluvial build-up, probably indicating a sudden change of regional environmental and alluvial regime. The landscape history of Liangchengzhen can shed light on 1) the agricultural production of late Neolithic China, and 2) the impact of landscape dynamics on prehistoric societies.

Lee, Kristina (Vanderbilt University)

[64] *Discussant*

Lee, Lori (Flagler College)

[74] *Intersectionality and Health Consumerism in Antebellum Virginia*

This presentation explores intersectionality in the context of health consumerism in antebellum central Virginia. Health consumerism incorporates the modern sense of patients' involvement in their own health care decisions and the degree of access enslaved African Americans had to resources that shaped their health and well-being experiences. To emphasize the multilayered nature of health and illness, this analysis engages Margaret Lock and Nancy Scheper-Hughes' "three bodies model." The three elements comprising this model consist of 1) the individual body—the physical body and personal experience of the body, including the mind; 2) the social body—the body as it is socially represented in various symbolic and metaphorical forms; and 3) the body politic—regulation, surveillance, and control of bodies (both individual and collective) in reproduction and sexuality, work and leisure, and sickness. This model allows for the assessment of intersectionality across domains of power. Public health is a growing research focus that uses an intersectional approach. I argue that understanding intersectionality in past health approaches is critical for understanding modern public health challenges.

Lee, Rachel (University of Washington)

[278] *Household Change and Social Complexity in Prehistoric Korea*

Household archaeology has made important contributions to the study of large-scale social transformations through the remains of the everyday. This paper examines the role of households, themselves, in the social changes that occurred during the Early and Middle Mumun Pottery Periods (ca. 1500–500 BC) in Korea. During this time, incipient social inequality developed alongside another significant change—households that were previously composed of multiple families became single-family units. Excavations of pithouses are presented from Daepyeong and Pyeonggeo-dong, two Mumun settlements from the Nam River region of southern Korea. I examine household changes at these settlements and their relationship with increasing complexity. In particular, I argue that the breakdown of multifamily households raised the potential for competition in Mumun society, ultimately helping to create a sociopolitical context for inequality to develop at densely populated settlements such as Daepyeong.

Lee-Thorp, Julia [30] see Fernández-Crespo, Teresa

Lefebvre, Karine (CIGA—UNAM)

[322] *Ruptura y Continuidad: El impacto de la conquista tarasca en la región de Acámbaro—Maravatio*

A mitad del siglo XV, el joven reino tarasco llevó a cabo una importante fase de expansión de su territorio. Es en este marco que la región de Acámbaro-Maravatío, ubicado a unos 130 km de laguna de Pátzcuaro (corazón del reino), cayó en mano de los tarascos. Pero la conquista no se persiguió más allá y el sector de Acámbaro se convirtió en una zona de frontera. La dominación tarasca de la región fue breve, apenas unos 80 años. Sin embargo, estas ocho décadas fueron suficientes para que el poder tarasco ejerciera su dominación sobre las poblaciones, el territorio y sus recursos. A partir de la confrontación sistemática de datos arqueológicos e históricos, volveremos en varios cambios y permanencias registrados en la región en distintas esferas (política, económica y cultural) de la sociedad tras la conquista tarasca, tal como la continuidad del patrón de asentamiento, la conservación parcial de la élite local, la importación de artefactos desde el centro del reino, la integración diferenciada de los distintos grupos étnicos que residían ahí. Lo anterior permitirá reflexionar sobre la política de expansión y el nivel de control que los tarascos ejercieron sobre los territorios y las poblaciones sometidas.

LeFebvre, Michelle (University of Florida), Susan deFrance (University of Florida), George Kamenov (University of Florida), William Keegan (University of Florida) and John Krigbaum (University of Florida)

[284] *The Zooarchaeology and Isotopic Ecology of the Bahamian Hutia* (*Geocapromys ingrahami*)

Bahamian hutia (*Geocapromys ingrahami*) are small sized rodents endemic to the Bahamas. Fossil and subfossil records indicate broad geographic distribution of the rodent across the Bahamas in the past, while today Bahamian hutia naturally occur on one island. Bahamian hutia have received little attention archaeologically resulting in critical gaps in our understanding of both natural and anthropogenic patterns in Bahamian hutia distribution and life history. In conjunction with "traditional" zooarchaeological data (e.g., morphometric ranges, geographic distribution, and archaeological context), multiple isotope proxies from bone collagen, bone apatite, and tooth enamel apatite are presented to address geographical origins, management and dietary ecology of sampled archaeological hutia. For example, with respect to bone collagen, mean $\delta^{13}\text{C}$ (-19.5‰) and $\delta^{15}\text{N}$ (5.9‰) values support a predominantly C₃-based dietary regime. Interestingly, one individual exhibits a large $\delta^{13}\text{C}$ apatite-collagen spacing of 11.8‰ , which suggests some C₄ carbohydrate food source in addition to C₃-based protein in its diet. Strontium isotope ratios of second molar tooth enamel for all specimens assayed reflect $87\text{Sr}/86\text{Sr}$ of modern seawater, between 0.7091 and 0.7092. The data suggest significant indigenous human influence on Bahamian hutia in the past, providing a historical background for Bahamian hutia ecology and distribution today.

LeFebvre, Michelle [340] see Colten, Roger

Lefrançois-Leduc, Alex [178] see Loewen, Brad

Legare, David (Las Cruces District BLM)

[124] *El Camino Real de Tierra Adentro: Public Perceptions and Management*

Management of the Jornada del Muerto segment of El Camino Real de Tierra Adentro National Historic Trail over the last nine years has provided insights into a wide range of behaviors and perceptions about a physical manifestation of history and its meaning and role in our lives. As with many historic/archaeological sites, there is a mythic El Camino as well as an archaeological/historic El Camino. Trail management is sometimes a question of balancing and enhancing and sometimes a question of dispelling and deterrence. The story of the trail goes deeper in time and lasts longer than the three centuries that are cited as its period of significance. Those perceptions of the trail and the meanings that derive from them color the ways that the Bureau of Land Management and the National Park Service manage and interpret El Camino for various members of the public. This presentation focuses on those perceptions, the public's interpretation of the trail, and the management issues that arise from the interactions among the agencies charged with management and the members of the public for whom it is managed.

[255] *Discussant*

Legg, James [395] see Cobb, Charles

Lehew, Anita [92] see Jansen, Amelia

Lei, Xingshan [213] see Chastain, Matthew

Leidwanger, Justin [240] see Daniels, Megan

Leight, Megan (CUNY Graduate Center) and Christina Halperin (Université de Montréal)

[209] *Classic Maya Textiles and the Crafting of Communities*

One of the striking features of contemporary Maya textiles is that their production techniques and aesthetics can be highly regionalized. These textiles manifest strong village, town, and community identities while simultaneously reproducing other identity formations (e.g., gender, ethnicity). Likewise, Classic period Maya (ca. 300–900 CE) political formations were highly regionalized with multiple, shifting centers of gravity. Nonetheless, relatively little is known about the variability of Classic period textiles across the Maya Lowlands and whether textiles were caught up in the political fissions and regionalisms identified in hieroglyphic texts. This paper explores several Classic period Maya textile and garment traditions that have been previously overlooked in the literature. We suggest that unlike other crafting communities, those surrounding textiles often defied the boundaries of petty politics.

Leitermann, Garrett (New Mexico State University)

[390] *The Applicability of Laser-Induced Breakdown Spectroscopy (LIBS): A Case Study of Sourcing Ceramics in the Northern Mimbres Area*

The use of Neutron Activation Analysis (NAA) has been the primary technique for ceramic sourcing studies within archaeology for the last several decades. Laser-Induced Breakdown Spectroscopy (LIBS) is an atomic emission spectroscopy technique that provides archaeologists with a time and cost effective alternative to NAA. LIBS has been used by the author on a large sample of corrugated sherds originating from two Classic Mimbres sites within the Gila National Forest of New Mexico in an attempt to explain the presence of a high volume of distinctively non-Mimbres corrugated wares within the region. More precisely, the author will attempt to use LIBS to test if the significant presence of nonlocal corrugated wares is indicative of high levels of cultural interaction or trade with other cultural groups or if their presence is the result of the adoption or copying of technological and stylistic techniques by local producers. The applicability of LIBS for ceramic sourcing studies will be demonstrated by the results of the author's research.

Lekson, Stephen (University of Colorado)**[393]** *Big (Pre)History in North America: A View from the Southwest*

While there are hopeful signs of change, for most of the last half century American anthropological archaeology has been highly skeptical or openly hostile to continental-scale dynamics, particularly north of Mexico. Why was that? This paper briefly explores the history of our discipline, contrasts it to Europe and Latin America, and remarks on emerging, more realistic frames-of-reference for the prehistory of Native agricultural societies in North America. Examples begin with old chestnuts in the Southwest and Mississippi Valley, and move out: from sea to shining sea, and from north and south as far as corn was grown. Summarily, of course.

[373] *Discussant***Lemke, Ashley (University of Texas at Arlington) and John O'Shea (University of Michigan)****[286]** *Cooperation or Competition? The Underwater Archaeology of Communal Hunting Structures*

Forager cooperation can be difficult to detect in archaeological contexts. One approach is to focus on built structures, such as drive lanes or fishing weirs, which required the participation of multiple persons. Yet such features are ephemeral and vulnerable to disturbance and destruction. One way to circumvent these challenges is to target areas with excellent preservation, such as underwater contexts. For example, the cold, fresh water of the Great Lakes preserved 9,000-year-old stone built hunting structures. Due to their submerged setting, these features are virtually intact, and their social and environmental contexts can be investigated on a regional scale. Structures range from simple hunting blinds to complex drive lanes; and their formal attributes including placement on the landscape can be used to infer group size, composition, and seasonality. Yet while communal hunting is often held as a classic example of forager cooperation, permanent built structures raise issues of ownership, property, and territoriality which are at odds with ideals of egalitarian hunter-gatherers. Therefore, the use of such structures by early Holocene foragers may reflect both cooperative and competitive behaviors. We present results from research under Lake Huron on communal hunting structures to comment on the nature of forager cooperation.

LeMoine, Genevieve (Bowdoin College)**[35]** *Weasels, Seals, Bears: Late Dorset Miniature Carvings as Indicators of Individual Hunter/Prey Relationships*

Miniature carvings recovered from Paleo-Inuit Dorset culture sites (2800–700 BP) across the Canadian Arctic and northwestern Greenland offer tantalizing glimpses of human-animal relations of this prehistoric group. Recently scholars such as Matt Betts and Mari Hardenberg have begun a productive line of inquiry drawing on representational ecology to contextualize and enrich understanding of the social nature of these relationships and the symbolic role of the carvings of polar bears in particular among the Dorset. Their studies, and most others, consider a broad range of carvings from sites across the north. This paper builds on such work but focuses on subset of carvings: those found tightly grouped in situ, which can be interpreted as having belonged to a single individual at a particular point in time. These “caches” of amulets lend themselves to a consideration of the specific, individual, relationships between hunters and the animals they preyed on, needed protection from, or relied on as helpers, and from there, a better understanding of specific practices of Dorset hunters. Carving caches from Lita, Greenland, and the Arvik and Tasiarulik sites on Little Cornwallis Island, Canada will be the focus.

LeMoine, Genevieve [144] see Darwent, John

Lemonnier, Eva [131] see Nondédéo, Philippe

Lenci, Eric, Jr. [92] see Monroe, Cara

Lengyel, Imre [235] see Edinborough, Marija

Lenoir, Michel [169] see Steele, Teresa

Lenssen-Erz, Tilman (African Archaeology, University of Cologne), Brigitte Mathiak (Data Center for the Humanities, University of Colo), Eymard Faeder (African Archaeology, University of Cologne), Maya von Czerniewicz (African Archaeology, University of Cologne) and Joana Wilmeroth (Dept. for Computing in Arts and Humanities, Univer)**[210]** *Scenic Narratives of Humans and Animals in Namibian Rock Art*

In prehistoric rock art the notion of “scene” always played an important role but a clear and widely accepted definition of scene does not exist and little was written about what constitutes a scene. If informing context lacks, Gestalt features are often taken to identify what can be considered a meaningful scene. If we consider a scene as displaying a social animated configuration, then the Gestalt laws alone are an insufficient tool. Particularly in scenes including humans and animals interaction should be considered as well. Here we present a formal approach that provides a rigid framework for the definition of scenic coherence encompassing Gestalt and interaction. This approach allows quantification across the large corpus of Brandberg rock art and it shows that just 2.4% of all scenes show “encounters” of humans and animals. Only once in 117 encounters the animal is clearly in a dominant role. Our data suggest that combining humans and animals in scenes (not in juxtaposition) may be a narrative of hierarchical agency. For the future we aim to grasp the structures of scenic narratives through cooperation with computer science, exploring whether algorithm based data mining enables us to identify underlying rules of scene formation.

Lentz, David L. (University of Cincinnati), Nicholas Dunning (University of Cincinnati) and Vernon Scarborough (University of Cincinnati)**[285]** *Resilience and Regime Shift at the Ancient Maya City of Tikal*

Over the time span of nearly a millennium, the ancient Maya polity of Tikal went through periods of growth, reorganization and adaptive cycles of various connected scales. Recent data show that following the reorganization of the Late Preclassic period, Tikal experienced an extended period of technological innovation and population growth that stretched the carrying capacity of the available landscape. A hydraulic system was constructed that provided water for the community during the dry seasons: a powerful development in an area without a permanent water source. Agriculture was intensified using a combination of root crop agriculture, irrigated fields, arboriculture, household gardens, short fallow cropping systems and bajo margin cultivation. The net product of these diverse production activities undoubtedly helped to underwrite an enormous amassing of economic and political capital during the Late Classic period. Ultimately, in the mid-ninth century AD, expansive growth combined with multiple system disturbances led to a collapse of the city's social structure followed by abandonment of the site. The application of resilience theory as a conceptual framework has been useful in helping to interpret the complex web of the underlying social and ecological domains that contributed to Tikal's demise.

Lentz, Kari**[188]** *Irish Independence in the Crapper? Irish Republican Army Buttons in San Francisco*

This paper examines two Irish Republican Army buttons discovered in a privy associated with a late nineteenth-century household in San Francisco in order to elucidate how Irish immigrants became Irish Americans on the West Coast. Archaeologists and historians have studied the Irish Diaspora, this they have largely focused on the Northeast. While the Irish Republican Army is familiar to contemporary audiences, many people are unaware of the organization's nineteenth-century roots in the United States. The brass military fasteners derive from the uniform of an IRA soldier who participated in Canadian Raids waged by the Fenian Brotherhood in the 1860 and 70s. The physical journey of the garment from the Northeast to California engendered the object with import. This paper will attempt to answer the questions of who owned this item and why was it discarded by analyzing the remainder of the collection with insight from historical documents. In addition, this paper will examine assemblages from other Irish households in the neighborhood to better understand how Irish ethnicity identity is expressed through material culture.

Lentz, Kari [75] see Downey, Jordan

Leon, Claudia [368] see Sanchez Miranda, Guadalupe

Leon Romero, Claudia**[349]** *Ancient Cacao Groves in Yucatán: A Palynological Approach*

Cacao had a transcendental role in the life of prehistoric people of Mesoamerica, becoming part of their economic, ideological and social system. Due to the morphological and environmental characteristics necessary for the growth of cacao tree, the main producers were concentrated in places like southern Mexico and Central America. However, written sources of the first colonizers in Yucatán disclose that the indigenous nobility of that time had at their disposal cacao orchards in different hollows called *rejolladas* or *ts'ats*. Pollen and radiocarbon analyses were made from sediment cores at *ts'ats* Xkakhui from the eastern Yucatán. The presence of *Theobroma cacao* pollen confirms the use of these species, at least from the Post Classic period, when Mayapán was the controller of trade in the north of the peninsula. But the vast iconography of cacao at Chichén Itzá reflected the ideal environment of cultivation of this plant, and the occupation of some *rejolladas* and *ts'ats* during the heyday of this city could trace the beginning of this practice centuries before.

Leonard, Alison (University of York), Steve Ashby (University of York) and Dries Tys (Vrije University, Brussels)**[282]** *The North Sea and the "Long" Viking Age: Connections and Communication*

This talk presents the results of a northern European collaborative pilot study on the compilation and analysis of internationally-derived datasets of metal-detected material culture. Drawing on nascent heritage initiatives across northern Europe designed to protect and record our at-risk portable material culture, the project seeks to develop and trial a methodology for the synthesis and analysis of metal-detected datasets from England, Denmark, Belgium, and the Netherlands, resulting in the first international synthesis of this material. The project focuses on the North Sea littoral in the Iron Age/Early Medieval period leading up to and throughout the "Viking Age" (c. AD 700–1100)—a period characterized by extensive long-distance networks of trade, migration, and communication. In addition to piloting cross-border data synthesis, the project will analyse the distributions and long-distance routes of movement of artifacts and people, thus shedding light on the interconnectedness of the "Long Viking Age" in the North Sea. The results will be of interest to those making use of metal-detected data regardless of period specialization, particularly with reference to strategies for the effective integration of these diverse and problematic datasets.

[282] *Chair*

Leonard, Jennifer [101] see Marinkovich, Erik

Leoso, Edith (Bad River Tribal Historic Preservation Officer)**[295]** *Discussant*

Lepofsky, Dana [47] see Neudorf, Christina

Lepofsky, Dana [77] see Greening, Spencer

Leppard, Thomas (University of Cambridge) and Jason Laffoon (Leiden University)**[133]** *Patterns and Outliers in Prehistoric Island Mobility: Comparing the Strontium Data*

During the colonization of islands in the Pacific and Caribbean by agropastoral communities, a variety of proxies (e.g., material, genetic, zoogeographic) indicate substantial interisland and intercommunity contact. It has been suggested that this contact represents an adaptive response to intrinsic demographic fragility during the initial phases of island colonization, and that this connectivity imperative faded in the aftermath of initial dispersal as overall population density increased. Here we evaluate this model by synthesizing and comparing increasingly available $87\text{Sr}/86\text{Sr}$ data from funerary populations in the Pacific and Caribbean. Highlighting possible limitations in a comparatively small body of data (not least statistical limitations relating to small sample sizes and problems pertaining to geochemical characterization), we nonetheless tentatively suggest broad patterns, as well as outliers, as regards post-juvenile mobility in both areas. We relate these patterns to recurring types of sociodemographic organization in early agropastoral island communities (especially in terms of general trends in interisland mobility over time), and discuss the broader implications for understanding how island environments imposed—or did not impose—constraints on the organization of communities cross-culturally.

Leppard, Thomas [32] see O'Connor, John

Leroy, Stephanie [323] see Hendrickson, Mitch

Lesage, Louis [30] see Pfeiffer, Susan

Leslie, David (University of Connecticut) and Kevin McBride (University of Connecticut)**[223]** *Warm or Cold Season of Capture? Oyster Middens from Block Island, Rhode Island*

Previous research on Block Island, Rhode Island, indicates that during the Woodland Period, the island was likely occupied year-round and maritime resources accounted for a significant portion of peoples' diets. Native American sites on the island include semipermanent villages near the Great Salt Pond and fishing, temporary seasonal, and task specific camps away from villages. Season of occupation for these sites is important to frame our understanding of a developing maritime economy. Several oyster middens (*Crassostrea virginica*), associated with Woodland Period sites were identified on Block Island during a Phase I and II survey of the coastline, conducted to document and salvage archaeological sites exposed and disturbed by Hurricane Sandy. Archaeological oyster shells were powdered at the terminal growth band and analyzed for stable isotope values ($\delta^{18}\text{O}$). To determine season of capture, archaeological $\delta^{18}\text{O}$ values were contrasted with modern oyster shell $\delta^{18}\text{O}$ values, collected from three separate locations on Block Island; these were sampled incrementally from the terminal growth band along the hinge to estimate modern seasonal shell growth. A number of the archaeological sites also contained faunal remains indicative of season of capture (Atlantic Sturgeon and Grey and Harbor Seals) providing a check for shell-derived season of capture estimates.

Leslie, David [199] see Sportman, Sarah P.

Letelier Cosmelli, Javiera [246] see Nuevo Delaunay, Amalia

Letham, Bryn (University of British Columbia)**[176]** *A Tale of Two Villages: Exploring the Role of Villages with Massive Shell Accumulations as Anthropogenic Coastline Modifications in Prince Rupert Harbour*

3D mapping, percussion coring, and radiocarbon dating are used to explore the geoarchaeology and chronology of two villages composed of massive shell deposits in the Prince Rupert Harbour. We map out accumulation and development of these sites through time and demonstrate that they are major anthropogenic coastline modifications, which, with dozens of other large villages in the area, form a substantial built environment. As well as providing well-drained terraformed terraces on which to build houses and conduct village life, these locations buffered against foreshore erosion and relative sea level change, thereby increasing resilience of communities and establishing enduring places that were occupied for millennia. However, radiocarbon analyses of the two villages show that each formed differently. One was occupied nearly continuously for the last 6,000 years with expansions and contractions and periods of punctuated shell accumulation, while the other was occupied 2500–1500 BP, was constructed rapidly, and maintained its original occupied area through time. We argue that though we can generate hypotheses about how these constructions functioned to shape the Harbour's cultures, the two cases' different chronologies and developmental histories indicate that there are also specific histories behind these mounds' accumulations, which require other lines of evidence to unpack.

[176] *Chair*

Letham, Bryn [49] see Duelks, Jonathan

Leuvano, Nolan [300] see Dodd, Lynn

Leventhal, Alan [30] see Gardner, Karen

Leventhal, Richard (University of Pennsylvania)**[280]** *The Maya: Historic Archaeology and Archaeology of Historic Periods*

The study of the ancient Maya has become complicated over the past 30 years. As the ancient Maya writing has been deciphered, these texts provide an historical record of parts of the ancient social and political systems. This development has moved the study of the Maya past into the realm of historic archaeology. In addition, the study of the colonial period in the Maya area has focused upon Spanish and indigenous texts to understand this historic period but additionally to create analogical models of Maya systems that could be used to understand the nature of the ancient Maya world. Even ethnological studies of modern Maya people and communities have become a focal point for the study of the prehistoric Maya. Such an approach within the academic world has positioned the Maya of today as a model for understanding the past. The secondary nature of the living Maya is echoed in the modern representation of the Yucatán as a place of sand and ruins—not part of the living twenty-first century. This paper will examine the nature of historic archaeology and the archaeology of the historic past and heritage of the Maya in the Yucatán and throughout the lowlands.

[280] *Chair***Levi, Laura (University of Texas at San Antonio), Christian Sheumaker (University of Texas at San Antonio) and Sarah Boudreaux (University of Texas at San Antonio)****[83]** *Wayfinding: Paths, Pathway Markers, and Navigational Monuments at Wari Camp and Beyond*

Social life never proceeds in the absence of a spatial dimension that defines, brackets, segregates, alters or otherwise organizes interaction. The power to organize space emerges historically from the sweep of institutional arrangements across society and operates along many different dimensions and scales, at once establishing boundaries all the while insidiously permeating them. This historical process—this "social production of space"—is what we refer to as landscape. Landscape has been a foundational concept for research at the Programme for Belize site of Wari Camp for almost 15 years. We have explored how the spaces of social life there facilitated control by political leaders over a diverse array of people and landforms, and how people through their various institutional affiliations devised a multiplicity of provisioning strategies. Yet only recently have we begun to detect the manner in which people and things moved within and among these spaces. Our paper celebrating the 25th anniversary of research at Programme for Belize tackles this particular dimension of place-making. We focus on the identification of paths, pathway markers and navigational monuments because their distributional patterning provides unexpected insights into both community and regional landscapes.

Levin, Maureece (Stanford University) and Floyd Silbanuz**[229]** *Fire Up the Uhmw: Deciphering Botanical Residues from Earth Ovens in Pohnpei, Federated States of Micronesia*

In Pohnpei, Micronesia, the uhmw, or earth oven, is one important way of preparing food. These ovens are typically located in cookhouses next to residential sites. Pohnpeians use heated stones on the ground to cook food and cover items with large leaves while cooking. It is clear that uhmw are a

long-standing Pohnpeian tradition, as multiple examples have been found in the archaeological record. In this paper, we ask what botanical residues from umhw can tell us about the prehistory and history of Pohnpeian culinary practices. We analyze microbotanical remains (phytoliths, raphides) and macrobotanical remains from umhw features on Temwen Island, Pohnpei. We also integrate analysis of the cookhouse structures. Finally, we discuss Pohnpeian umhw in larger Pacific context, including the social importance of earth ovens throughout the region, highlighting the importance of the study of botanical residues in understanding past culinary practices.

Levine, Abigail (University of California, Los Angeles)

[391] *Not Quite One and the Same: Repetition and Rule in the Inka Provinces*

The use of molds for pottery manufacture is an integral part of the ceramic tradition of the North Coast of Peru, dating to at least as early as AD 100. Analysis of mold-made Chimu-Inka monkey effigy vessels excavated from mortuary contexts at the sites of Farfan and Tucume suggest that Late Horizon fineware production occurred in local workshops rather than in a centralized facility—a pattern consistent with other studies of Inka pottery production from around the Central Andes. The use and repetition of the monkey icon in these contexts—facilitated through the use of molds—is especially significant. The use of monkey icons has a long history in the region, dating to the Formative Period, and is common in the Late Intermediate Period mortuary assemblages. Although Inka presence on the coast resulted in the abandonment of certain motifs, the monkey effigy vessel persists throughout the Late Horizon. Importantly, while the use of distinct sets of monkey molds indicates production in disparate facilities, general similarities in form and style nonetheless speak to larger scale artistic canons and principles. Adherence to these selected local traditions was likely a critical facet of state-sanctioned or ritually significant contexts in areas colonized by the Inka.

Levine, Marc (University of Oklahoma)

[135] *Mixtec Goldworking: New Evidence for Lost-Wax Casting from Late Postclassic Tututepec, Oaxaca*

Gold jewelry and ornaments produced in Late Postclassic Oaxaca were among the finest ever made in Mesoamerica. Yet the paucity of archaeological evidence for metallurgical production in Oaxaca has frustrated efforts to better understand these spectacular objects and their role in Postclassic society. This paper presents the results of an analysis of 42 ceramic molds from the Late Postclassic (1100–1522 CE) Mixtec Capital of Tututepec. I argue that the molds were utilized to cast internal cores, which played a pivotal role in the overall process of lost-wax casting. No other molds of this type have ever been reported from Mesoamerica. The presence of casting core molds, in conjunction with ancillary household evidence for metallurgical production, suggests that Tututepec was an important metalworking center. Finally, I discuss how metallurgical production and gold jewelry may have figured in Tututepec's political, social, and economic spheres.

Levine, Mary Ann (Franklin and Marshall College)

[188] *Moravian Travels through the "Spirit's Nest": Archaeology of Colonialism at Madame Montour's Otstonwakin*

In 1741, Moravians, a sect of German pietists established a settlement in Pennsylvania which became the principal religious and administrative center for the Moravian Church in North America. Moravian missionaries soon traveled to nearby Native American communities including Otstonwakin, an eighteenth-century multinational village along the West Branch of the Susquehanna River. Madame Montour served as a frontier diplomat and go-between at Otstonwakin and hosted a succession of visitors into her home including several Moravian missionaries. Moravians sought to have Otstonwakin become an important part of the mission structure in the region and describe it as the "spirit's nest," a place where evil spirits were thought to be present. This paper examines eighteenth century colonial encounters through the maps, diaries, and travel accounts left by Moravians who sought to proselytize to Native Americans at Otstonwakin.

[311] *Moderator*

[311] *Discussant*

Levstik, Linda [97] see Henderson, A. Gwynn

Levy, Janet (UNC at Charlotte)

[109] *Discussant*

Levy, Thomas E. (University of California, San Diego) and Neil G. Smith (King Abdullah University of Science and Technology)

[29] *Cyber-Archaeology, Scientific Storytelling, and the GIS Nexus*

Since 1999, UC San Diego Levantine Archaeology Laboratory excavations have been "paperless" with the aim of developing digital data acquisition, curation, and 2D and 3D dissemination tools for archaeological and cultural heritage data. GIS provides the nexus for our data flow because all archaeological data collected in the field has a geospatial footprint. The X, Y and Z coordinates of the archaeological data provides the organizational and visualization principle of the archaeological endeavor. Our real-time GIS data recording software, ArchField, provides the main data-recording tool during the excavation process. Tablet based Open-Dig, records the metadata concerning the contextual aspects of the excavated material culture; and ArchaeoSTOR serves as a web-based geospatial database that pulls together a wide range of digital data in different formats from lidar, airborne photography, terrestrial and marine geophysics, Structure from Motion (SfM) and more. This data-flow provides the perfect tool kit for objective scientific storytelling, in our case, for the contentious field of Biblical Archaeology. To more effectively tell these stories, 'Big' cultural heritage data is moved over high-speed fiber optic networks and ultimately displayed in personal VR displays and total immersive 3D CAVE environments so that more people can experience the stories.

Levy, Thomas E. [297] see Jones, Ian

Lew, Rachael [230] see Carpio, Margaret

Lewandowski, David (Logan Simpson) and Theodore Tsouras (Logan Simpson)

[155] *Testing Methods for Ceramic Dating on Northern Black Mesa*

The presence and proportions of well-dated ceramic wares and types are used to date the occupation of sites across the Southwest, often to general periods or phases that exceed a site's likely occupation span. Various methods have previously been used to refine the dating of archaeological sites using ceramic artifacts. Recently, Logan Simpson conducted a Class III cultural resources survey of Peabody Western Coal Company's leased lands on northern Black Mesa, Arizona. This study uses ceramic types and wares to date the occupation of sites recorded during the survey. The study tests the effectiveness of various methods, including mean-ceramic dating techniques, for dating the surface ceramic assemblages at sites on northern Black

Mesa. The ceramic dates are compared with absolute dates obtained during excavations conducted by the Black Mesa Archaeological Project and used to examine chronology and settlement patterns across the surveyed mine areas.

Lewandowski, David [301] see Tsouras, Theodore

Lewarch, Dennis (Suquamish Tribe)

[7] *Calibrating Variation in Domestic Midden Assemblages among Aztec Period Households in Western Morelos*

Archaeologists and geographers calibrate the flow of commodities among households and settlements to infer patterns of production, consumption, economic function, and social class. Michael Smith and his colleagues developed sophisticated measurements of wealth and social class using residential architecture attributes and domestic artifact assemblage diversity from excavations at three Aztec Period sites in Morelos. Here, data from over 4,000 surface collection units in eight Aztec Period sites in the Coatlan del Rio Valley, Western Morelos, are partitioned into over 300 domestic middens. Collections are from plowed fields without direct surface evidence of house foundations, and were generated by occupants from a variety of household sizes, ranging from single, isolated houses to patio complexes with as many as five or six structures. I use 38 ceramic vessel classes, 15 stone tool classes, spindle whorls, and figurines to measure the flow of ceramics and lithics among households, identify artifact suites that likely correlate with economic functions, and infer stone tool and textile production localities. I compare patterns in the Coatlan data to those discussed by Smith and others at the excavated sites of Capilco, Cuexcomate, and Yautepec to expand their interpretations regarding Aztec Period social and economic organization in Morelos.

[108] *Discussant*

Lewis, Brandon (Santa Monica College) and Hugh Robichaux

[83] *Revealing La Milpa: Integrating Residential Data from the Core and Periphery*

The Programme for Belize Archaeological Project represents a regional research program aimed at elucidating the nature of Maya political, social, and economic integration within the northeastern Petén. Toward this end, extensive research is being undertaken at the primary center of La Milpa. Research conducted by the authors has been motivated by numerous objectives. Of specific interest is understanding the role of La Milpa within the changing political landscape of the region. In addition, our research examines the degree to which social status affects both economic and ideological activities at the courtyard level. To address these questions, we draw upon a large corpus of residential data collected over the past 25 years. We integrate an intensive analysis of elite lineages within the La Milpa core with an extensive examination of residential space throughout the periphery. Contrary to original interpretations, our results suggest that La Milpa was home to an entrenched elite class as early as the Late Preclassic. Consequently, we propose a revised model of political growth and power. Furthermore, we revisit population estimates for La Milpa and examine the extent to which status affected differential economic and ideological activities across the social hierarchy.

Lewis, Cecil [86] see Hofman, Courtney

Lewis, Michael D. (University of Utah), Joan Coltrain (University of Utah) and R. E. Burrillo (University of Utah)

[290] *Regional Variability in Stable Isotope Food-Web Baselines and Sex-Based Differences in Diet: An Example from Early Agriculturists in Southeastern Utah*

This paper provides an isotope-ecology context for Cedar Mesa, Utah, by presenting isotope data on over 400 modern botanical and archaeo-faunal specimens from the area. While carbon data fit with regional expectations, nitrogen isotope ratios throughout the Cedar Mesa food-web show depletion in $\delta^{15}\text{N}$ relative to other ecosystems in the intermountain west—consistent with nitrogen inputs from cytotobiotic soil crusts. In light of this localized isotope baseline, we reassess previously published isotope studies of Basketmaker II (BMII) burials by comparing modeled whole-diet isotope ratios with the feasible diet polygon (e.g., convex hull) defined by local resources. Implications for translating sex-based differences in BMII bone chemistry into engendered subsistence strategies are also discussed.

[290] *Chair*

Lew-Levy, Sheina (University of Cambridge), Rachel Reckin (University of Cambridge), Noa Lavi (University of Haifa), Jurgi Cristóbal-Azkarate (University of Cambridge) and Kate Ellis-Davies (University of Cambridge/Nottingham Trent University)

[193] *How Do Hunter-Gatherer Children Learn to Make Material Culture? a Meta-Ethnographic Review*

This poster aims to extrapolate forager-wide trends in how, when, and from whom hunter-gatherer children learn to produce material culture. We use a meta-ethnographic approach, which allows for the systematic extraction, synthesis, and comparison of quantitative and qualitative publications. We extracted a total of eleven publications from psychology, cultural anthropology, and ethnoarchaeology, including studies on the Baka, Aka, San, Kaytetye, Gidra, Penan, Batek, Khanty, Cree and Sioux. Our findings suggest that, cross-culturally, forager children learn to make simple tools effectively by middle childhood, but continue to learn and perfect the skills of complex, multicomponent tool manufacture well into adulthood. From infancy, adults make models of tools like bows, arrows, and digging sticks to give children, from which they are expected during early and middle childhood to reverse engineer their own small tools. During middle childhood, the playgroup is especially important, creating miniature camps complete with hearths and dwellings. As they enter later childhood and adolescence, children begin to receive their first direct instruction on the production of complex material culture like basketry, sledges, or skis. These findings suggest that children create and contribute to material culture in vital ways that archaeologists often fail to consider.

Li, Jean [18] see Carter, Michael

Li, Jiawei (School of Life Science, Jilin University), Ye Zhang (School of Life Science, Jilin University), Xiyan Wu (School of Life Science, Jilin University), Yongbin Zhao (College of Life Science, Jilin Normal University) and Hui Zhou (School of Life Science, Jilin University)

[115] *Ancient DNA of a Nomadic Population Provides Evidence of the Genetic Structure of the Royal Ancient Mongols*

The genetic diversity of the ancient Mongols, especially the Gold family of Genghis Khan remains unclear. Gangga site was a nomadic site dated to the eighth to tenth centuries AD in the HulunBuir grassland, northeast China. This site belonged to the Shiwei population, believed to be the direct ancestors of the ancient Mongols. Nine graves at the Gangga site were excavated with log coffins, which were considered the characteristic burial custom of the royal ancient Mongols, included the Gold family of Genghis Khan. This suggests the Gangga people had a close relationship with the royal ancient Mongols. In this study, mitochondrial and Y-chromosome aDNA were extracted to analyze the genetic structure of the Shiwei population at the Gangga site. Haplogroups D, F, C, B, G, N9a were typed in the mtDNA. Haplogroup C-M130 was detected in Y-chromosome aDNA. Gangga people exhibited a high frequency of Haplogroup C-F3918 (belonging to C3*), indicating it may be the main Y-haplogroup in the Shiwei population. In addition, all Gangga

males buried in log coffins exhibited C-F3918 suggesting that C-F3918 might be the characteristic Y-chromosome haplogroup of the royal ancient Mongols.

Li, Min (UCLA)

[95] *Taming the Flood: Religious Response to Climatic Crisis and the Cult of the Great Yu in Early China*

This paper deals with changes in religious practices during a period when 'Nature' is least stable in early China. It focuses on the rapid spread of new ritual practices and emergence of new ritual networks during the Longshan period (ca. 2300–1800 BCE) as evidence for religious responses to the extraordinary climatic crisis of the late third millennium BCE. It explores the diverse manifestations of the ecological crisis in geomorphological evidence and their implications for a changing perception of 'Nature' in the Longshan society. The choices of sacred places and ritual forms used for prehistoric ritual engagements with the violent forces of nature reveal that the legacy of the Longshan religious tradition had significant contribution to the emergence of the cult of the Great Yu in early China.

Li, Shuicheng

[26] *At the Margin of a World System: Cultural Histories between the Eurasian Steppe and Northwest China*

After 4000 BC, prehistoric populations in southern Kazakhstan and the western side of the Urals in Central Asia began to migrate toward southwestern Siberia. At the same time, Yangshao culture began to spread, and the scale of their expansion toward the northwest was the greatest. The causes are likely multifold. Firstly, the emergence of agriculture in Holocene led to the increases in population pressure. Secondly, the arrival of the Copper Age increased the demand for metals such as copper and gold. The latter may also have been a significant cause for the appearance of new metallurgy exchange spheres to the west of the Urals. These large-scale population migrations had a long lasting impact on the prehistoric cultures of southwestern Siberia and Xinjiang. The exchanges between the painted pottery-agriculture of the east and the pressure stamped pottery, animal husbandry of the north stimulated the formation of early East-West interaction pathway. This was an important pathway for cultural and trade exchanges between the East and the West. Here, I will name it the proto-Silk Road. This wide road greatly initiated the complexity of prehistoric societies in China, and laid down the earliest foundations for what is known as the Silk Road today.

Li, Xinwei (Institute of Archaeology, CASS) and Jorge Ramos

[71] *Reconstructions of 8N-11 and Reforms of Late Classic Copan*

8N-11 is a sub-royal elite residential compound located at the end of the eastern causeway (sac be) in the densely settled Las Sepulturas zone about 850 m from the Copan Main Group. Monumental architecture, carving style and representations of figures with royal attributes demonstrate the high status that residents of the 8N-11 enjoyed in Copan society. In collaboration with the Honduran Institute of Anthropology and History and the Anthropology Department of Harvard University, Project IACASS (Institute of Archaeology, of Chinese Academy of Social Sciences), started field work at the group in 2015, aiming a comprehensive culture history of the people who lived here. Construction sequence (four phases) documented to date shows the social, economic and ideological evolution of the group in consonance with the development of the royal family in the city core, especially during the reigns of 11–16 dynasts. Themes restricted to the royal court were conveyed early in architectural sculpture at 8N-11.

Li, Xiuzhen (Emperor Qin Shihuang's Mausoleum Site Museum), Marcos Martín-Torres (UCL Institute of Archaeology, London, UK), Andrew Bevan (UCL Institute of Archaeology, London, UK) and Thilo Rehren (UCL Institute of Archaeology, London, UK)

[58] *Casting Metals for the Qin First Emperor and His Underground Empire*

Among the most spectacular finds at the Mausoleum of China's First Emperor (259–210 BC) are the Terracotta Army built to protect him in the afterlife, and the two sets bronze chariots designed and buried to facilitate his travel in his underground empire. Thousands of terracotta warriors are equipped with casting bronze weapons, including swords, lances, halberds, spears, crossbows, and arrows, and the quantity and quality of bronze weaponry provide an extremely rare opportunity to investigate patterns of standardization and labor organization of bronze production within such a context. In addition, the bronze chariots comprise 4,000 parts assembled together, including numerous cast gold and silver ornaments that offer information about knowledge of transfer, technological changes, and cultural identity, particularly when compared to the forging, filigree, and granulation used to produce early Qin gold objects (techniques assumed to derive from Western influences). The casting technique employed here seems more consistent with an indigenous tradition manifest in cast weapons and ritual bronzes produced for centuries in the central plains of China. This presentation will show the research results from combining compositional, microscopic, statistical, and spatial analysis, to investigate the human behavior, imperial logistics, and cultural interaction behind the metal production for the Qin First Emperor and his afterlife.

[58] *Chair*

Li, Yinghua (Dr.), Side Hao (Provincial Museum of Hainan Island), Wanbo Huang (Institute of Vertebrate Paleontology and Paleoanth), Hubert Forestier (Muséum National d'Histoire Naturelle, UMR 7194 CNR) and Yudian Zhou (School of History, Wuhan University)

[78] *A New Variability of Cobble-Tool Industry Associated with a Bone Tool Technology from the Luobi Cave, South China (Ca. 11–10 Ka): A Comparative Perspective from Southeast Asia*

The characterization of Paleolithic culture in South China and their relationship with mainland Southeast Asia remains ill-defined and unclearly known. The lithic industry of South China has been characterized as simple "cobble-tool" industry persisting from early Pleistocene to Holocene and the most representative industry of Southeast Asia was also marked by pebble-tool techno-complex termed Hoabinhian during late Pleistocene-early Holocene. The possible cultural link of the two regions was proposed by some scholars but the technological characteristics and variability within the two industries was elusive. In this research we conducted technological analysis on a "cobble-tool" industry associated with a bone tool technology from the Luobi Cave, Hainan Island, dated to ca. 11–10 ka and compared it with a well-studied typical Hoabinhian site of Laang Spean in Cambodia. The major difference of two has rejected the Luobi Cave as a potential Hoabinhian site, indicating a high originality and a new variability in the tool kit of modern human groups during late Pleistocene-early Holocene transition in South China and Southeast Asia. This study represents the first step toward deciphering the cultural variability in this region from a technological view and suggests that behavioral modernity and cultural variability should be evaluated in regional and subregional scale.

Li, Yiping (Research Center for Chinese Frontier Archaeology, Jilin University)

[113] *Social Difference between Songze Culture and Liangzhu Culture as Reflected on Jade Artifacts*

The Liangzhu Culture (3300–2000 BC) and the Songze Culture (4000–3300 BC) are two Neolithic cultures in the lower Yangtze River Delta in China. The two cultures are quite similar in many aspects especially those reflected on ceramics. This research intends to study the difference of social hierarchy between two cultures through an analysis of jades collected from over 20 archaeological sites in the Lake Tai region. By doing so, it is argued that jades in the Songze Culture are precious materials and are seen as symbols of wealth; and in the Liangzhu Culture, jades become sacred and are more exclusively accessible to the ruling class.

Li, Yue (School of Cultural Heritage, Northwest University), Yue You (School of History, Capital Normal University), Yiting Liu (Department of Archaeology, Graduate School of Chi), Nuo Xu (Xi'an Museum) and Jianxin Wang (School of Cultural Heritage, Northwest University)
[116] *Abnormalities of Horse Vertebrae from Xigou Site and Shirenzigou Site in Xinjiang*

This research examines seven horse skeletons unearthed from the burials and sacrificial pits of the late Warring States Period to the early Western Han Dynasty at the Shirenzigou and Xigou sites in Xinjiang. Vertebrae were observed for lesions such as hyperostosis, asymmetry, spinal fusion, horizontal fractures on epiphyses, and dorsal inter-pressing or joining of the vertebrae. Because the abnormalities are similar to those identified as the result of horseback riding in archaeological research outside China, as well as in veterinary medicine and osteology, their presence here is highly suggestive of human use for riding. This is consistent with saddles found in other sites and petroglyphs near the Shirenzigou and Xigou sites that show riding scenes, providing additional clues for the appearance of horseback riding during the late Warring States and early Western Han in Xinjiang.

Lian, Huiru, Dorian Q. Fuller and Yijie Zhuang

[78] *A Glimpse of Rice Exploitation at Mojaoshan Site, Liangzhu Culture: Archaeobotany and Rice Charring Experiment*

Located at the Lower Yangtze River, China, Mojaoshan Site is a "palace" and center of Liangzhu Culture. On the edge of the Mojaoshan platform, a waste accumulation of rice (H11) was found in recent years. Based on the archaeobotanic remains from this accumulation, this paper tries to preliminarily discuss the rice exploitation at Mojaoshan Site. By conducting a charring experiment aiming to distinguish the rice broken before charring from rice broken after charring, the research tried to identify rice-processing stages in the charred materials. The result shows that most rice recovered from Mojaoshan site was rice charred with husk (*Oryza sativa* Subsp. Japonica Temperate japonica group [syn. Sinica]) and Liangzhu people were likely to adopt an early harvesting strategy to optimize the yield of rice. Also, rice in Mojaoshan site was threshed, winnowed, sieved and stored under a clean state. The exploitation of rice provides a solid foundation for the development of Liangzhu culture and also reflects the highly complexity of Liangzhu Culture.

Lian, Olav [47] see Neudorf, Christina

Liang, Zhonghe [113] see Wolin, Daniela

Liebmann, Matt (Harvard University)

[34] *Movement Encased in Stone: Revealing Ancestral Jemez Migration through Obsidian Source Provenience*

Based on the results of collaborative research performed in conjunction with the Pueblo of Jemez, this paper uses a pXRF study of 2222 obsidian artifacts from 29 Ancestral Puebloan villages in northern New Mexico to provide insights into Jemez movement between AD 1175–1700. The results reveal clear evidence of migration between these villages and the Valles Caldera. These movements steadily increased in intensity throughout the precolonial period. This pattern was disrupted by Spanish colonialism in the seventeenth century, only to be reestablished following the famous Pueblo Revolt of 1680. This paper explores the complex factors underlying these shifting patterns of obsidian procurement, and concludes that they were apparently linked to larger intertribal hostilities and alliances during the tumultuous first century of colonization in the Pueblo world.

Liebmann, Matt [34] see Tosa, Paul

Liesinger, Brian [394] see Smith, J. Gregory

Lieskovsky, Tibor (Faculty of Civil Engineering, Slovak University of Technology in Bratislava), Milan Kovac (Department of Religious Studies, Faculty of Philo) and Tomas Drapela

[131] *Usability of Lidar Data for Archaeological Survey in the Uaxactun Area, North Petén, Guatemala*

The paper deals with validation and quality estimation of spatial data acquired in the focus area of the project "Proyecto arqueológico regional—Uaxactun" as a part of a LIDAR project supported by the PACUNAM. The project has two high-quality 3D models of the Preclassical city of Uaxactun and the site of Dos Torres acquired by detailed topographical survey of the focus area at its disposal. The DEMs serve as basis for the evaluation of spatial accuracy of the lidar DSM and an etalon for calibration of filtration methods. To evaluate the ability of lidar data to identify archaeological structures, we will use data acquired by pedestrian survey realized in the course of the project in seasons 2009–2016 and also data from previous surveys (Acevedo 2012; Puleston 1983). The result will be a definition of the abilities and limitations of current LIDAR data in the focus area.

Lieverse, Angela (University of Saskatchewan), Samantha Purchase-Manchester (University of Saskatchewan), Andrzej Weber (University of Alberta) and Vladimir Ivanovich Bazaliiskii (Irkutsk State University)

[330] *A Novel Examination of Infection among Middle Holocene Hunter-Fisher-Gatherers of the Cis-Baikal, Siberia*

This research uses novel methods to investigate infection—specifically sinusitis, otitis, and mastoiditis—and better understand physiological stress and lifeways among middle Holocene hunter-fisher-gatherers from Siberia's Cis-Baikal region. Two hundred and fifty individuals from three cemeteries are examined, together representing two distinct biocultural periods (Early Neolithic [EN], 8000–7000/6800 BP, and Late Neolithic–Early Bronze Age [LN–EBA], 6000/5800–3400 BP) and two micro-regions (South Baikal and the Angara River Valley). An endoscope was used to document sinusitis and otitis, and a handheld digital X-ray system was used for mastoiditis. Sinusitis was present in over two-thirds of observed individuals (70.6%), while otitis and mastoiditis (considered together) were found to be nearly ubiquitous (99.4%). The frequency of sinusitis decreased significantly from the EN to the LN–EBA, being consistent with the results of previous research on physiological stress. On the other hand, it did not appear to reflect differences in occupational phases (for the cemetery of Shamanka II, only), sex, or age at death. These new approaches to examining infection have expanded our understanding of past hunter-fisher-gatherer lifeways in the middle Holocene Cis-Baikal and have opened the door for their use at other sites.

Lim, Sangtaek (Pusan National University)

[24] *Beyond Activity Areas, Beyond Burial Spaces: Islands as a Monumental Place for Coastal Foragers*

Coastal foragers of southern Korean Chulmun period had actively exploited marine resources from the initial phase (6000–4500 BCE), and they also have a complex network with groups of Japanese Kyushu Island from that times. Researchers usually have thought that islands served as economic patches for coastal foragers with large numbers of shell mounds. However, based on several burial sites recently excavated at some islands like gadeok, Yeondae, Yokji, we now need to reconsider islands as being just resource patches. We have to shift our view of islands fundamentally—not just as a materialistic "space" for resource exploitation or burials but as an empirical "places" for rituals, memories, living activities and so on for foragers. In

doing so, islands acquired meaning of “spaceness” of their own, which can be connected with monumental characteristics of islands. Islands are monumental places for coastal foragers of Korean Chulmun period and economic, ritual practices, including resource exploitation and burial making, all of which enhanced the “spaceness” of islands.

Lima, Helena [327] see Schmidt, Morgan

Limp, W. Fredrick (University of Arkansas)
[149] *Discussant*

Lin, Kuei-chen (Institute of History and Philology, Academia Sinica)

[213] *Standardization in Pottery Production of the Jinsha Site, Chengdu Plain, China*

In earlier studies, scholars have focused on the measurement of vessels' dimensions to assess the degree of standardization. It should be noted however that not all dimensions are culturally salient or equally important. Moreover, when manufacturing processes can be decomposed into multiple stages, cultural idiosyncrasies that have been shaped through either institutionalized or unconscious ways might affect and be sought in any of these stages. This has called for analyses on ceramics by using different scientific strategies. Through testing the dimensional measurements and mineral compositions of several vessel types that were popular in the Jinsha site (ca. 1200–650 BC), it appears that their degrees of standardization, though vary with both loci and phases, are generally greater than vessels found in other sites at the outskirts. The spatial pattern of the pottery kilns unearthed in this early urban center, Jinsha, might be a key to the formation of consensus. I suggest that the production scale should lie in between households and workshops, in which kilns were close but meanwhile were spaced by buildings or other features such that they can be loosely bonded. Such manner of production organization might also reveal the pattern plural social groups co-resided in Jinsha.

Lin, Sam (University of Wollongong), Shannon P. McPherron (Max Planck Institute for Evolutionary Anthropology), Luke Premo (Washington State University) and Claudio Tennie (University of Birmingham)

[38] *Modeling the Effects of Knapper Decision-Making and Social Learning on Flake Assemblage Variability*

Paleolithic archaeologists are keen to infer the means by which flintknapping knowledge was acquired and transmitted among past toolmakers from lithic assemblages. The inferences generated from recent studies, which tackle this issue with a variety of analytical approaches, are often fraught with equifinality because the same range of lithic variability can be explained by multiple learning scenarios. To help address this issue, we examine the extent to which different knapper decision-making processes result in recognizably different lithic assemblages. Our agent-based model simulates the formation of a flake assemblage over a range of knapping options, with each option marked by variable parameters of flake size, utility, and failure risk. The decision-making process for choosing the desired knapping option at each time step is set to resemble that expected under either emulation (copying the final form) or imitation (copying the production steps). Results indicate that an imitative decision-making process can achieve higher rates of successful flake production than an emulative process when the assessment error of the available knapping options is large. The findings help connect emergent properties of a lithic assemblage to different forms of knapper decision-making, with implications for inferring past social learning mechanisms from the stone artifact record.

Lin, Sam [40] see Leader, George

Lin, Yi-Ling, Yuling He (Institute of Archaeology, Chinese Academy of Social Sciences), Zezhen Pan (Department of Energy, Environmental & Chemical Eng) and Daniel Giammar (Department of Energy, Environmental & Chemical Eng)

[72] *Trace Metals in Soils as Indicators of Past Human Activities at Hanwangdu East, Anyang, China*

Through chemical analyses of soils, bones, and organic residues, archaeologists can identify anthropogenic impacts on environment at archaeological sites. In this research, we are interested in understanding if and how bronze production had impact on the environment during Bronze Age China. Soil samples from Hanwangdu East, a Middle Shang period site at Anyang, were analyzed by using inductively coupled plasma mass spectrometry (ICP-MS). The purpose of this project is to 1) evaluate if ICP-MS is a proper method to analysis soil samples regarding of soil-metal concentration; 2) compare soil samples from different contexts, such as ash pits, water wells, canals, and house structures, of the same time period, and samples from features of different time period to identify anthropogenic influence on soil-metal concentration related to bronze production. We expect to see different geochemical signals in the soil depending on the various contexts of this site. We hope to gain a better understanding of the anthropogenic and natural soil properties at Anyang, especially during the Middle Shang period.

Lindeman, Michael (Desert Archaeology) and Henry Wallace

[335] *Ancestral Ties during a Period of Social Upheaval: An Example from the Early Classic Period in the Tucson Basin*

The transition to the early Classic Period (ca. AD 1100–1300) in the Tucson Basin has its roots in the disintegration of long-lived Preclassic Period (ca. AD 500–1100) villages in the eleventh century. The break-up of these villages engendered a variety of responses among the constituent social groups including the use of ancestral ties to place, real or constructed, to stake claims to land. Early Classic period settlement at the site of AA:12:46 begins during the fluid period immediately following the breakup of the Preclassic villages. During the twelfth century a corporate group made up of three households settled at the site. The choice of location was not random with the households building within the confines of a plaza of a short-lived village abandoned 400 years before. The new inhabitants made an overt display of their connection to ancestors and place. We suggest that this was important amid the social tensions of the twelfth century to establish rights to the adjacent floodplain farmlands and the water needed to irrigate their crops. While AA:12:46 is a good example of this process in the Hohokam region, other instances of Classic Period construction in Preclassic plazas are considered here.

Lindo, John [176] see Malhi, Ripan

Lindquist, Shayna (University of Kentucky)

[320] *Intraregional Variation in the Obsidian Industry of the Eastern Lower Papaloapan Basin of Mexico*

The Tres Zapotes regional systematic survey, conducted from 2014–2016, yielded an obsidian assemblage spanning across the Formative and into a Postclassic occupation. Furthermore, similarities and differences in technology and sources utilized were observed within the RRATZ assemblage, facilitating an examination into the intraregional variation in obsidian artifact production and use. In addition, one unusual artifact type was recovered that may reflect specialized scraping activities and that were perhaps lowland-centric. The scraper artifact possibly models a highland type that is generally

attributed to maguey processing; however, the maguey plant is rare in the lowlands and the typology differs considerably in other respects as well, suggesting the scraper may have been used for processing another material, such as ixtle. This paper thus will provide a preliminary analysis of variation in the RRATZ obsidian assemblage and further investigate the potential of a lowland-centric scraper artifact within the regional polity.

Lindsay, Audrey [126] see Roberts, Victoria

Lindsay, David (Society for American Archaeology)
[206] *Discussant*

Lindsay, Ian (Purdue University)
[147] *Discussant*

Lindstroem, Gunvor (German Archaeological Institute)
[221] *Torbuk: A Sanctuary in the Hellenistic Far East*

A sanctuary of the Hellenistic period was recently discovered at the village of Torbuk in southwest Tajikistan. Its discovery was based on a random find of a large limestone vessel, identified as a perirrhanterion—a vessel for Greek purification rituals. The excavations, started in 2013 by a German-Tajik team, gave insights into the structure of the sanctuary and confirmed the dating to the third and second century BC, as Bactria was part of the Hellenistic world. The unearthed installations and objects show the performed rituals were inspired not only by Greek customs—as the purification ritual—but also by local traditions, with a high importance of water and ashes. The site seems to have functioned as a pilgrim sanctuary, associated to an ancient settlement at distance of ca. 30 km.

Lindstrøm, Torill Christine [90] see Ruhl, Erika

Linford, Samantha (University of Colorado Boulder)
[390] *Ceramic Sociology Revisited: Ceramic Design Analysis in the Sand Canyon Locality*

Tracing complicated social links such as kinship through the material record has fallen in and out of favor in anthropological discourse. The ceramic sociologists of the 1960s and 1970s (Hill 1966; Longacre 1970) focused on tracking kinship through spatial patterning of ceramic designs among Pueblo sites in the American Southwest. The concept of ceramic sociology sparked many critiques within archaeology (Allen and Richardson 1971). These critiques were tied to a need for better understanding of formation processes, proper and accurate classifications of ceramic designs and the degree to which social organization such as, kinship can be identified. The issues raised by the ceramic sociologists are important and deserve a solution, or at the very least a conversation. Kinship studies in anthropology have reemerged allowing this research to address the critiques previously leveled at ceramic sociologists. Analyzing style data from ceramics at the Sand Canyon locality in southwest Colorado, the issue of proper and accurate classifications of ceramic design are revisited in the application of the conceptual metaphor theory. Formation processes and kinship construction are addressed through ethnographic and linguistic studies providing a reworked commentary on material culture patterns correlated to kinship relations.

Ling, Johan and Per Cornell (Department of Historical Studies: University of Go)
[28] *Rock Art, Warfare, and Long-Distance Trade*

For most of the twentieth century the Bronze Age rock art in Southern Scandinavia has been seen as a manifestation of an agrarian “cultic” ideology in the landscape. In this context the dominant ship image and the armed humans have been perceived as abstract religious icons, not as active symbols relating to real praxis in the landscape. While violence and war related social and ritual traits indeed are common features in the Scandinavian rock art from the Bronze Age and the violence on the rocks is uncanny. It is, beyond any doubt, a dimension of rock art that we cannot deny or be blind to. The rock art appears at the same time as Scandinavian societies became engaged in long distance trade of metal and local warriors would have increasingly played an important role. Elite households investment in the maritime forces of production, ships and warriors, was therefore a crucial feature for engagement in this kind of action. This would have favored the rise of maritime polities in Scandinavia. In this paper, I argue for the notion that the praxis of carving ships onto the stone could have served to manifest the agency of the maritime warriors.

Lingle, Ashley (Cardiff University)
[73] *Reflexive Conservation Research at Çatalhöyük*

Çatalhöyük, like many earthen sites, is a complex exercise in preservation. Since it was first excavated in the 1960s there have been efforts to preserve the archaeological substrate. A significant part of this program was the application of aqueous polymer systems applied as a consolidant to the plaster and mud brick surfaces. This practice of attempting to strengthen walls by polymerization was reviewed by means of laboratory testing in the 1990s, and continued to some extent unchallenged for the following 20 years. In recent years, however, it became necessary to revise the suitability of this polymer system. As the aims for stabilization shifted from temporary to long-term display, and site monitoring improved, specific deterioration patterns emerged which correlated with failure of the polymer rather than deterioration of the archaeological substrate. This dilemma provided an interesting opportunity to review the practice, and challenge the adequacy of a methodology that is not unique to Çatalhöyük. To achieve this Fourier Transform Infrared microspectroscopy was coupled with a holistic study of the environment at the site. As a result, a new interpretation of the performance of polymer systems within the archaeological substrate allows for a more informed conservation practice in the future.

Linn, Meredith (Barnard College)
[74] *“Irish Fever”: How the Intersection of Ethnicity, Class, and Typhus Fever Created an Epidemic of Prejudice in Nineteenth-Century NYC*

During the height of the Great Hunger in Ireland in the late 1840s, epidemic typhus fever infected thousands aboard emigrant ships destined for New York City. Suddenly, a disease that had long been known as “jail-fever” or “ship-fever” became the “Irish fever.” It was no longer associated with a place, but with a people. This paper will explain why (for many Americans) the intersection between typhus fever and the bodies of rural Irish laborers created a new disease, one they used to naturalize and expand previous ideas of Irish racial difference. It will use the archaeological record to interpret how immigrants attempted to heal themselves and to destabilize stereotypical caricatures of “Pat” and “Bridget.” In doing so, this study will employ intersectionality theory beyond its original emphasis on the intersection between gender and other identities (although gender has important roles in this study too). It aims to draw greater attention to the importance of both the social construction of medical knowledge and particular illness status in the lives of immigrants and in the development of racial and ethnic categories.

Lints, Andrew [319] see Boyd, Matthew

Lints, Andrew D. (University of Alberta) and John W. Ives (University of Alberta)

[339] *Art in the Time of Promontory Cave: Enhancement of Rock Art Figures Using DStretch*

While the Promontory caves are well-known for their preservation of perishable cultural materials, the red-ochre pictographs inside Promontory Cave 1 have attracted less attention. The conditions within the cave provided a 'safe haven' for organic artifacts, but the pictographs themselves have varying degrees of visibility, from quite good to poor. Archaeologists have relied solely upon descriptions made by Julian Steward during his 1930s work. Advancements in digital imagery and rock art software, such as DStretch, provide the opportunity to greatly enhance these images, providing new insights. Not only were digital analyses successful in providing fuller images of these ancient paintings, but previously indecipherable design elements were clarified, revealing classic late Fremont forms. In addition to the enhancements of previously identified rock art, we report new rock art paintings located in the vicinity of the Promontory caves. We compare these restored Promontory Point images with examples from Grotto Canyon in southwestern Alberta, where identical images document contact between the late Fremont world and a region Apachean ancestors could be expected to have inhabited.

Lipe, William (Washington State University), Laura Ellyson (Washington State University), Kyle Bocinsky (Crow Canyon Archaeological Center), Robin Lyle (Crow Canyon Archaeological Center) and R. G. Matson (University of British Columbia)

[142] *Costly Gobbling: Raising Turkeys in the Central Mesa Verde Area*

In the Central Mesa Verde (CMV) area of the Southwest, turkey bones increased markedly relative to those of artiodactyls in sites of the late AD 1100s and 1200s. We present an exploratory model of the proportional contribution of turkeys, artiodactyls, and small mammals to the animal protein component of the diet. Assuming a demand of 5 to 10 g of animal protein/person/day, we estimate that more than half that demand was met by turkeys in the mid-1200s. Both turkeys and humans relied heavily on maize; raising a "food turkey" would have annually required a third as much maize as would an adult human. Depending on turkeys for animal protein may have created a "rigidity trap." High population and aggregation led to wild game depletion. Continued population growth promoted more dependence on turkeys, requiring even more reliance on maize (and fresh water sources) in a CMV subsistence economy based on dry farming. The Northern Rio Grande (NRG) received substantial migrations from the CMV in the late 1200s. Although turkeys became more important in the NRG after AD 1250, our model indicates artiodactyls continued to supply the majority of animal protein there.

Lipe, William [142] see Matson, R.G.

Lipnina, Ekaterina [332] see Kato, Hirofumi

Lipo, Carl (Binghamton University), Robert J. DiNapoli (University of Oregon), Alex Morrison (International Archaeological Research Institute) and Terry Hunt (University of Oregon)

[302] *Spatial Association between Rapa Nui (Easter Island) Ahu and Freshwater Sources*

The famous ahu and moai monuments of Rapa Nui (Easter Island, Chile) are features associated with multiple relatively small-scale communities distributed around the island. These communities are marked archaeologically by repeated sets of domestic architectural classes surrounding ceremonial features (i.e., ahu and moai) that potentially served to functionally integrate local populations. Described in this fashion, this settlement pattern offers the potential to explain the substantial investments in monuments using a multilevel and signaling based evolutionary framework. Such an explanation, however, requires the identification of the set of resources over which individuals compete as well as share. Here, we suggest that freshwater may have played a critical role in the formation and functioning on prehistoric Rapa Nui communities. We demonstrate this potential by examining the varying spatial association of a number of archaeological features with the location of freshwater. We argue that freshwater resources were a key factor leading to the structure of prehistoric communities and the unprecedented level of cultural elaboration on this tiny and remote island.

Lipo, Carl [300] see McElhoes, Jennifer

Lippert, Dorothy (National Museum of Natural History)

[63] *Moderator*

Lira-Lopez, Yamile

[236] *Cerámica mayólica en un sitio posclásico del Valle intermontano de Maltrata, Veracruz*

El valle de Maltrata, enclavado en la Sierra Madre Oriental, al centro-oeste del estado de Veracruz, ha tenido una remota y continua ocupación humana, que data desde la época prehispánica hasta nuestros días. Este valle es importante por formar parte de una de las principales rutas de comunicación y comercio entre la Costa del Golfo y el Altiplano Central, con evidencias olmecas, zapotecas, Teotihuacanas, cholultecas, aztecas. El asentamiento del periodo Posclásico, ocupó principalmente la parte central del valle, donde se encontró gran cantidad de fragmentos de cerámica mayólica, colonial y prehispánica. Se identificaron diversos tipos de cerámica mayólica de los siglos XVI–XIX en el recorrido sistemático de superficie. Aquí veremos cómo se distribuyó la población hispana con base en la cerámica mayólica, profundizando en la relación hispana-indígena en los años después de la conquista y, durante la época Colonial, desde la arqueología histórica. El trabajo es relevante pues no hay estudios sobre cerámica mayólica en la región de las grandes montañas del centro de Veracruz. Los materiales recuperados por el proyecto "Arqueología del valle de Maltrata, Veracruz" (Instituto de Antropología, Universidad Veracruzana e Instituto de Investigaciones Antropológicas-UNAM) continúan aportando valiosa información para la reconstrucción de la historia prehispánica y poshispana.

Litschi, Melissa (Southern Illinois University, Carbondale) and Alexia Moretti (University of Paris-Sorbonne, Paris IV)

[233] *Remote-Sensing Prospection of Recuay Architecture in the Jancu Region, Callejón de Huaylas, Peru*

The Recuay tomb of Jancu has contributed significantly to our understanding of Recuay mortuary practices and ancestral veneration. This subterranean tomb, which housed the remains of several elite individuals and finely crafted offerings, is typically discussed in isolation from its broader context. To date, no formal archaeological research has been conducted in the surrounding region, but recent preliminary surveys by the authors revealed numerous Recuay and Post-Recuay residential and funerary structures. Due to the relative inaccessibility of the region, remote-sensing technology offers a feasible alternative to pedestrian surveys as a method to characterize the distribution of prehispanic architecture in the area. As a preliminary

step in elucidating the sociopolitical context of the Jancu elite tomb, this study aims 1) to identify extant architecture near Jancu, and 2) to test the utility of widely accessible remote sensing options (low-resolution aerial photographs, Google Earth imagery, and Landsat IV satellite imagery) in an alpine environment. The results of this study will be tested during planned fieldwork in summer 2017, contributing both to refining the interpretations of mortuary practices and its ties to territoriality and ancestral veneration during the Recuay occupation of Jancu and to improving methodologies for archaeological survey in remote alpine environments.

Litteral, Matthew (University of South Florida)

[318] *More Than a Pair of Hands: The Education and Rights of Local Field-Workers*

The archaeologist abroad must be held responsible for the fair treatment of his/her locally sourced workers. Fair treatment should go beyond providing a pay check comparable to standards in the United States. Archaeologists should feel ethically obligated to provide a wealth of knowledge to local field-workers. There remains much inconsistency in adherence to SAA principles of ethics. Particularly principles 2 and 4, as they relate to the accountability to local peoples and comment to public education. In recent years, archaeology has made great strides in the realm of community outreach. Nevertheless, the rights and education of local field-workers are still frequently overlooked. Educating locally sourced workers is often far from being the top priority of the archaeologist abroad. What is uncovered through fieldwork is, first and foremost, the heritage of the community. Ensuring that the community is informed should be a primary goal of archaeologists, not only due to ethical concerns, but because the local population is an invaluable resource. In this paper, I present data on the prevalence of proposed local education components in U.S.-funded archaeology projects abroad. I then propose methods which may be employed for effectively informing locally sourced workers.

Liu, Chin-hsin (California State University Northridge), Adam Lauer (International Archaeological Research Institute, I), Stephen Acabado (Department of Anthropology, University of California), Katherine E. Quitmyer (Department of Anthropology, University of Florida) and John Krigbaum (Department of Anthropology, University of Florida)

[284] *Faunal Management and Human-Landscape Interactions at Ifugao, Luzon, Philippines*

One major contribution of the Ifugao Archaeological Project in the northern Philippines (Luzon) is associating the origins of the Ifugao wet-rice terrace complex with local resistance against Spanish colonial expansion. With the establishment of wet-rice agriculture in the highlands by the early seventeenth century, it is anticipated that the acquisition and management of fauna would have been modified to adapt to new strategies of crop production. In this context, it is hypothesized that changes in faunal diet over time would serve as a proxy to landscape change and animal management. For this study, identified faunal remains representing four taxa (43 teeth and 29 bones) recovered from Old Kiyangan Village are analyzed for light stable isotopes. Bone samples processed to data demonstrate good collagen yields and interesting patterns that reflect anthropogenic input. For example, carbon isotope ratios for Sus are very heterogeneous (in contrast to sampled bovines and deer), a pattern that supports the expectation that some individuals were opportunistic and/or refuse feeders most likely associated with human habitation. Isotopic data for sampled fauna are presented and discussed in light of the occupation of Old Kiyangan Village, and animal management in the context of Spanish colonial impact and local resistance.

Liu, Chung Yu (Department of Anthropology, National Taiwan University)

[208] *Settlement Configuration and Social Structure: Applying Spatial Comparative Analysis in Old-Kucapungane*

This article aims to examine the differences of social structure revealed 1) by the interpretations of the archaeological record through spatial analysis and, and 2) by the data obtained through ethnographic research, both for same ethnic group. Applications of spatial technologies in archaeology began in the early 1980s. Although these GIS-based technologies brought about new research perspectives, their 'effectiveness' and 'correctness' needs more in-depth investigations. Using Old-Kucapungane as a case study, this research compares the social structure reconstructed through space syntax, and the social structure observed from ethnography. Old-Kucapungane is an abandoned slate house settlement in Taiwan. The Kucapungane people lived in the settlement for the past 600–700 years. However, they were forced to move out 50 years ago due to government policies. Nonetheless, since they abandoned Old-Kucapungane relatively recently, a small amount of the current population still has memories of how living in the settlement was. This inevitably makes Old-Kucapungane a perfect example for a comparative study between archaeology and ethnography. The results of this research will highlight how comparative studies benefit from both perspectives. It not only provides new insights for archaeological interpretations, but also demonstrates the potential of how the Old-Kucapungane landscape was transformed in the past century.

Liu, Guoxiang [26] see Cui, Jianfeng

Liu, Xinyi (Department of Anthropology, Washington University in St. Louis)

[388] *The Use of Chenopodium Plants in China*

This article reviews the use of Chenopodium plants in Chinese archaeobotanical record. We will draw attention to two regions particularly, Northeast and Southwest China. We will consider the use of Chenopodium food in the context of origins of agriculture in China.

[26] *Discussant*

Liu, Yu, Jigen Tang (Professor) and Jianyu Liu (Dr.)

[72] *Pursuing the Mineral Sources of Yinxu Bronze Objects (13th–11th BC): Study on the Lead Ingots from Anyang, China*

The bronze objects played a more significant role in the formation of Chinese ancient civilization than any other early civilizations, especially in late Shang and Western Zhou dynasty (13th–11th BC). So far more than 2,000 bronze vessels and thousands of other type bronze objects were excavated from Yinxu, the capital of late Shang dynasty (13th–11th BC), located in Anyang, Henan province. The discussion of the mineral sources of Yinxu bronze objects last a long time because of rare ingots found in Anyang. Recently 300 pieces of lead ingots excavated from Anyang provide some new clues to solve the problem. Through Metalloscope observation, SEM-EDS and ICP-MS analysis of 12 ingot samples, the composition, microstructure, trace elements, and lead isotope data were analyzed. The results show that the ingots are not pure lead but lead-copper alloy. The lead isotope data belongs to "ordinary common lead," and is very close to those data from bronze objects or slags of the 4th phase of Yinxu period, which implies that the bronzes mineral source were probably from the same lead ore at that time, and the "highly radioactive lead" data probably indicates not the lead ore but the copper ore, such as Tongkuangyu in Zhongtiaoshan zone.

Livesay, Alison (University of Oklahoma)

[192] *Exploring Mimbres Social Memory through Burials and Architecture*

Social memory has become a topic of increasing investigation in the field of archaeology. While social memory in archaeology can often be very theoretical and abstract, it can also be very tangible and concrete in its archaeological manifestations. In this poster, I illustrate various social memory practices with specific emphasis on the reference process, strengths of associations, and intimacy past peoples had with their history as observed in

architecture and burials in the Mimbres region of southwestern New Mexico. I look diachronically at the superposition of structures over earlier structures, when and where intrusive burials placed into areas of earlier occupation occur, and how different room blocks, corporate groups and site participants might have interpreted the past and referenced it for the present and perceived future. This approach observes the physical links that architectural superposition has with the past, and how Mimbres groups interacted with their deceased ancestors and places formerly occupied by the now dead. Through this lens, we gain a unique perspective concerning how a group's perceptions and performances of the past are played out on the Mimbres landscape and over time. This research contributes to the discussion of both group and "place" formation, maintenance, and "abandonment."

Livingood, Patrick (University of Oklahoma)

[197] *Leadership Specialization among the Caddo and Their Neighbors of the Southeast*

One of the remarkable aspects about the Hasinai Caddo is the nature of their specialized leadership roles. This paper is going to take a comparative approach using ethnohistoric documents to examine the differences between the Caddo and their neighbors with regard to the types of specialized roles that exist, the types of divisions and circumscriptions on authority that exist for leaders, and the level of formality or informality in leadership function. The goal of the paper is to highlight what is and is not especially unique about the Hasinai Caddo.

[197] *Chair*

Ljungkvist, John (Uppsala University)

[15] *Centuries of Warrior Boat Graves: The Valsgärde Burial Ground*

The Valsgärde burial ground is one of key sites for the Viking phenomenon project. This burial site was used for more than 1,000 years. It is the best preserved and the only "entirely" excavated boat grave site in Sweden. Here we can follow the changing burial rites and interactions with the world during the first millennia AD. Valsgärde has been seen as a place where an unbroken series of male elite individuals were buried for nearly eight centuries. However, detailed studies of all burials, both inhumation and cremations, reveal that use and role of the site has underwent major changes. The composition of burials stretch from a wide variety of status, gender and age variation in the seventh century, to only rich female and male burials of the ninth/tenth century, to exclusively rich male burials during the major Christianization phase in the eleventh century. This place evidently became important to maintain an elite community's presence and history in the landscape, in this case primarily warriors buried in chambers and boats. In some phases are burials disappearing, but they eventually reappear and thus are the history the site and the warriors ancestry maintained.

Llobera, Marcos

[158] *Not Landscape: Landscape Archaeology as Bricolage*

The late 1980s and 1990s saw an explosion of landscape studies in archaeology. The notion of landscape was herald as a "usefully ambiguous concept" (Gosden and Head 1994) that was to be applied everywhere only to be later scrutinized and criticized. The emergent interest in landscapes helped archaeologists expand their understanding of the widely diverse range of relationships people maintain with their surroundings, and precipitated a renewed interest in the study of landscapes at a more intimate and experiential scale. It did little, however, to clarify the links, the middle range, that allow archaeologists to connect material evidences with sought out narratives. The following paper is meant as a work in progress where I try to uncover the essential components that make up an archaeological approach to the study of landscape. The orientation I proffer calls for an approach that is analytical in spirit, and that most likely resembles an act of bricolage. It does not seek out the pursue of the next theoretical concept but instead concerns itself with what characterizes a landscape archaeology study.

[37] *Discussant*

[118] *Chair*

Llobera, Marcos [118] see Hunt, David

Lo, Eric [29] see Meyer, Dominique

Lobo, Agustin [57] see Conesa, Francesc C.

Lobo, Jose

[277] *Settlement Scaling: Simple Equation, Familiar Variables, Rich Story*

The basic mathematical statement of settlement scaling involves a very simple equation (a "power law function") and variables long used in anthropology and archaeology to study the effects of demography on social processes. One could interpret the settlement scaling framework as another instance of the allometric relationship found very widely in the biological realm. But what may be more important is the fact that the framework actually incorporates a lot of accumulated insights from anthropology while leaving out concepts from economics and evolutionary biology that are ill suited to studying premodern human societies. This talk will review the assumptions behind the choice of equation and variables and highlight the concepts behind and implications of settlement scaling theory's mathematical framework.

Locascio, William (Florida Gulf Coast University) and Matthew Colvin (University of Georgia)

[377] *Prehistoric Tree Island Use in the Northern Everglades: New Evidence from the Late Archaic*

A season of test excavations at a late archaic tree island site in south Florida has produced several interesting, if broad, patterns in the practices of prehistoric peoples living within this landscape. Stratigraphic evidence further supported by AMS dating reveal use of the tree island spanning nearly 1,000 years of periodic long-term human occupation. Evidence attests to a certain "social fabric" at the settlement, suggesting its identity as a memorable place on the landscape, a quality contrary to what might be expected of existing models of tree island use in the prehistoric Everglades.

Locke, Brandon (Michigan State University) and Brian Geyer (Michigan State University)

[18] *LEADR at MSU: A Lab Approach to Digital Cultural Heritage in the Classroom*

Founded in August 2014, LEADR is both a physical space and a curriculum development initiative established as a collaboration between the Departments of History and Anthropology, and Matrix at Michigan State University. Fully equipped with large screens for group work, computers, cameras, 3D printers and scanners, microcomputing equipment, and other technology, LEADR is well equipped to facilitate innovative digital cultural heritage instruction and project development. The decentralized learning space facilitates collaboration and openness, and encourages experimentation and play. Sessions in LEADR create opportunities for students to take the content and methods that they have read and discussed in the classroom and apply them in hands-on experiences where they can build, experiment, and play, and then reflect on their experiences. Sessions focus on the critical use

of digital sources, tools, technology, and digital storytelling, often with at least one visit aimed solely at “flipped classroom” style guided work time. These courses are intended to prepare students with the digital skills relevant to careers in the contexts of archaeology, graduate school, and as citizens in the digital age. This session will address LEADR’s approach to curriculum development and course objectives, including successes and failures over the last two years.

Locker, Angelina (University of Texas at Austin) and Stacy Drake (University of Texas at Austin)

[83] *Exploring Migration and Kinship of the Ancient Maya through Isotopes and aDNA in NW Belize*

As a uniquely sustained archaeological research program that has annually excavated in the Rio Bravo Conservation and Management Area for 25 years, the Programme for Belize Archaeological Project (PfbAP) offers a wealth of knowledge for bioarchaeological research. This paper examines ancient Maya burials from northwestern Belize, spanning the Late Preclassic (250 BCE–250 CE) to the Terminal Classic (850–950 CE). Detailed here are stable isotope, ancient DNA, and osteological analyses from a small subset of individuals from the sites of Dos Hombres, Medicinal Trail, and Sak Chen. These data provide information regarding the migration, kinship, and health of the ancient Maya from northwestern Belize. The interplay between sustainability and population and demographic changes over time are postulated given the presented data and analysis.

Lockhart, Jami [87] see Hammerstedt, Scott

Locock, Andrew [91] see Morin, Jesse

Lodge, Spencer (Desert National Wildlife Refuge)

[142] *Fire on the Mountain: Roasting Pits in the Sheep Range on the Desert National Wildlife Refuge*

Within the Sheep Range in southern Nevada, I identified more than 200 roasting pit features with Google Earth, and subsequently recorded 193 of them. A color change that turns local dolomite and limestone white following exposure to high temperatures during use in an earth oven allowed these features to stand out in aerial imagery. Following documentation of these features, roasting pit distribution was analyzed according to midden size and vegetative community throughout the Range to identify patterns of use. Additional statistical analysis was performed to test the usefulness of aerial identification in zones with dense tree cover (Pinyon/Juniper). Finally, experimental work with limestone and dolomite from the Sheep Range was conducted to determine the temperature at which these materials change color. X-ray diffraction was used as well on tested rocks to identify material type and elemental makeup.

Loebel, Thomas (Illinois State Archaeological Survey)

[264] *Use Wear and Assemblage Composition: The Role of Endscrapers in Paleoindian Technological Organization*

Historically, microwear studies have focused around resolving issues centered on tool form and function. However, microwear also offers the opportunity to investigate site level activities surrounding “soft” technology, particularly in situations where organic preservation is poor or absent. In addition, when combined with a holistic approach to assemblage composition, microwear can provide larger insights into the organization of technology and larger patterns of adaptation. In this paper I discuss the results of microwear analysis of over 300 endscrapers from six early Paleoindian sites spanning the Eastern Woodlands, the results of which illuminates our understanding of early Paleoindian adaptations across time, space, and gender.

Loebel, Thomas [342] see Hill, Matthew G.

Loehman, Rachel [224] see Steffen, Anastasia

Loendorf, Chris (Gila River Indian Community)

[335] *Classic Period Settlement Patterns along the Middle Gila River*

This paper summarizes archaeological data that show a substantial decrease in population occurred between the Sedentary (ca. 950–1150 AD) and Classic Periods (ca. 1150–1500) along the middle Gila River in the Phoenix Basin. This decrease coincides with well documented increases along the lower Salt River. Extensive data suggest this pattern subsequently reversed in the Historic period, when people were again concentrated along the middle Gila, and the lower Salt River was extensively depopulated. The Salt and Gila Rivers have substantial differences in the topography and elevation of their drainage basins, which create divergent discharge regimes. Holocene climatic data suggest that conditions for irrigation along the Salt and Gila Rivers varied through time, and this variation may in part account for the differences in settlement patterns. These shifts in settlement patterns also affected ideological, economic, and political relationships within the region.

Loendorf, Chris [273] see Rodrigues, Teresa

Loendorf, Lawrence (Retired, Albuquerque, NM)

[175] *Tobacco-Related Imagery in Montana and Wyoming*

Pictographs and a few petroglyphs of tobacco plants, tobacco gardens and tobacco headdresses are found at a dozen sites across Montana and Wyoming. Very similar images painted on Crow Indian Tobacco Society pipe bags, moccasins and other clothing strongly suggest the pictographs and petroglyphs were made by the Crow. High concentrations of tobacco pollen at one site suggest it was the location of a tobacco garden.

Loewen, Brad (Université de Montréal), Christian Bélanger (Université de Montréal), Marie-Claude Brien (Arkéos inc.), Charles Dagneau (Parks Canada) and Alex Lefrançois-Leduc (Université de Montréal)

[178] *A Social Perspective on Wood Remains: Rural Colonization and Urban Growth in the Saint Lawrence Valley, 1600–1900 AD*

Dendrochronology is widely used as a dating tool in archaeology. In North America, the wood record is especially associated with colonial dynamics when farmlands were cleared, rural buildings were erected and young cities drew upon timber resources from expanding hinterlands. In the Saint Lawrence Valley, colonization began in the early seventeenth century and developed in waves, as prime agricultural lands were saturated and became launching pads for secondary colonization into marginal regions and industrializing cities. Some wood species were valued commodities whose sale injected cash into rural economies, while other species went conserved for local construction and still others became firewood. Colonists with greater socioeconomic power had access to more valued species, as compared to ordinary farmers and entrepreneurs. Such social dynamics are shown by a

broad-based dendrochronology program at the Université de Montréal, led by the Groupe de Recherche en Dendrochronologie Historique (GRDH). Since 2002, more than 80 sites have been studied from the Saint Lawrence estuary to eastern Ontario, providing more than 800 samples. This paper describes a dendro-archaeological approach that considers wood species, felling dates, and tree provenance within their archaeological context, and focuses on socio-environmental relations as revealed by the study of archaeological wood.

Lofaro, Ellen (University of Tennessee), George Kamenov (Department of Geological Sciences, University of F), Jorge Luis Soto Maguino (Dirección Desconcentrada de Cultura de Ayacucho, A) and John Krigbaum (Department of Anthropology, University of Florida)

[331] *Identity, Residential Mobility, and Anthropogenic Lead in Early Colonial Huamanga (Ayacucho), Peru*

La Iglesia de la Compañía de Jesús de Huamanga, the earliest Jesuit church in modern-day Ayacucho, Peru, was built in AD 1605 near the main plaza. Famous for its baroque art, this standing church is in need of extensive renovations. In a partial restoration in 2008, an archaeological excavation uncovered human and faunal remains underneath the church floor proper, and underneath the floors of associated chapels. Upon examination, only indigenous individuals appear to be buried underneath the church floors; significantly, few individuals show signs of stress or disease. Likewise, ethnohistorical documents show indigenous Peruvians using the Spanish legal system, church service and labor agreements to evade forced labor at the mines of Huancavelica and Potosi, among others. Analyses of strontium isotopes reveal that one-third of the individuals were not born locally, correlating with census records documenting rural migration into the city. Lead isotope results are narrow and lead concentrations are high, indicating the presence of anthropogenic lead, potentially resulting from pollution caused by extensive mining during the period. These data argue that indigenous people actively shaped their lives through migration and used Spanish religious and legal systems to avoid the harshest occupations, thus moving beyond the stereotypical Black Legend trope.

Loftin, Samuel [366] see Copeland, Sandi

Loftis, Kat and Robert J. Speakman (CAIS, University of Georgia)

[86] *Analysis of XAD as a Pretreatment Method for Radiocarbon Dating Bone*

The presence of exogenous organic carbon is a major concern when radiocarbon dating bone. A particular source of error and frustration in the field of radiocarbon dating has been the analysis of bone that has undergone humification. Humification occurs during burial and results from a combination of two distinct processes: Maillard reactions involving indigenous organic carbon, and the complexation of collagen with soil humic substances. Soil humic substances—composed of fulvic acids, humic acids and humins—are hydrophilic, predominately aromatic, heterogeneous complexes that originate from the polymerization of plant and animal biomolecules. As such, the ages of humic substances reflect the numerous and composite geochemical reactions that lead to their formation. The radiocarbon date of humified bone, then, reflects the age of the bone as well as the exogenous humic carbon. Pretreatment methods, such as XAD solid-phase extraction and single-amino acid radiocarbon dating, have been developed to eliminate contaminant carbon and provide a purified collagen sample for dating. Here we present results from our study in which collagen was reacted with a soil humic standard and the effectiveness of chemical purification of the collagen using XAD resin was assessed.

Lohse, Jon (Coastal Environments, Inc.), Derek Hamilton (SUERC), Takeshi Inomata (University of Arizona) and Hector Neff (California State University, Long Beach)

[81] *Fire and Ash: Formative Period Environmental Chronologies in Eastern Mesoamerica*

Recent dating work has led to revision of regional political chronologies in the Guatemala Highlands. In particular, key Middle and Late Formative phases now date as much as 300 years later than previously believed. This reanalysis brings these phases in line with significant environmental conditions stemming from volcanism and drought. In this paper, we present new high-precision chronologies for these environmental records, and compare these records against regional political chronologies in order to suggest how cultural developments may have been influenced by these factors.

Lokhov, Dmitrii [332] see Kato, Hirofumi

Lombardo, Umberto (Universitat Pompeu Fabra)

[325] *Estimating the Precolumbian Population of Southwestern Amazonia.*

Estimates of population density in precolumbian Amazonia have been based on calculations of the carrying capacity of the environment, generally classified as varzea, terra firme, and savannah. These estimates, however, have been criticized because they overlook the fact that 1) the Amazonia environment is far more diverse in terms of soils, vegetation, and climate than this simplistic classification, and 2) precolumbians increased, both intentionally and unintentionally, the productivity of the land through raised field agriculture and terra preta. Moreover, at the time when these estimates of precolumbian population size were formulated, most of the current archaeological data about Amazonia was unavailable. Here, we estimate the population density of the Monumental Mounds Region (MMR), in the Bolivian Amazon, based on archaeological evidence and ethnographic analogies. We calculate a minimum population size based on the amount of work needed to build all the earthworks present in the MMR and a maximum population size based on the use that modern indigenous groups make of natural resources. In particular, we focus on the use of wood: comparing archaeological data, ethnographic evidence, and forest primary production.

Lonaker, Sydney (Arizona State University), Julie Hoggarth (Baylor University) and Jaime Awe (Northern Arizona University)

[236] *Methods for Intensive Data Collection on Terminal Deposits in the Belize River Valley, Belize*

Terminal deposits, defined here as dense midden-like assemblages that contain nonelite and elite paraphernalia (i.e., utilitarian and decorated ceramic vessels, faunal remains, obsidian blades, ground stone tools, and human remains) have been discovered at sites across central and northern Belize. Despite the research on these features, there is little consensus on what type of activities these deposits represent. In the past, archaeologists have labelled these deposits as de facto refuse, primary or transposed middens, problematic deposits, termination rituals, garbage associated with feasting events, evidence for rapid abandonment, and post-abandonment rituals. Systemically testing these hypotheses is difficult, as research projects excavate these deposits using a range of methods. This makes direct comparisons across regions challenging. In an effort to better understand the composition, deposition, function, and spatial patterns of these terminal deposits, the Belize Valley Archaeological Reconnaissance Project (BVAR) developed standardized documentation and excavation protocols for excavating the deposits. This presentation describes the methods used in these excavations, including photogrammetry, mapping, and intensive recording of dateable organic material and polychrome ceramics. We propose these new approaches for creating comparable datasets across regions.

Long, Elizabeth (Texas State University, Anthropology Department, Graduate Student)

[390] *Saenger Pottery Works: Preliminary Report: Unlocking a Town's History through their Pottery*

This investigation of historical ceramics is conducted on a collection that dates from 1886 to 1915. Saenger Pottery Works was in operation from ca.1885 through ca. 1915. The size, form, and function variability of the ceramics inform about production techniques used and what forms are preferred over others. The sherds previously collected are currently dated based on makers' marks, stylistic attributes, and the period of kiln operation. However, issues with the dating method need resolution due to occupation by multiple groups and the inability to use proper dating techniques. The issues in provenience and provenance are discussed because the pottery, while attributable to the site, do not have records of excavation. Background research is a joint effort with the president of the town Historical Society. One result was the discovery of an African American cemetery, which appears on maps from 1836 until 1983. Additionally, a darker history is revealing itself with the discovery of a long-forgotten disturbing criminal with familial ties to current residents. The investigation seeks to find the historical significance Elmendorf has in the development of San Antonio and the State of Texas. Research is currently on going, and an excavation of the Saenger site is under development.

Longie, Erich [394] see O'Boyle, Robert

Longstaffe, Fred [8] see Moreiras Reynaga, Diana

Loomis, Sarah [9] see Hartford, Alexis

Lopez, Carlos (Universidad Tecnológica de Pereira, Colombia) and Martha Cano

[226] *The Earliest Occupation of Colombia: Balance and Perspectives at the Beginning of the Twenty-First Century*

In First Americans research in Colombia, the last three decades of the twentieth century were significant in terms of enthusiasm and motivation. Studies carried out by scholars such as Ruth Gruhn and Alan Bryan in Venezuela and other places were fundamental references for Colombian teams and encouraged advances in Pleistocene archaeology. Gonzalo Correal, Thomas Van der Hammen and Gerardo Reichel-Dolmatoff, among others, followed widely their contributions. Following Colombian generations of archaeologists discovered in the 1990s, new sites were discovered and new interpretations of site contexts were considered according to theoretical and methodological issues of the era. However, the balance in production and publications lacks continuity in the beginning of the twenty-first century; there are few accomplishments despite a growing number of opportunities for developing studies. Overall, there has been a general increase in research on the first occupants of the Sub-Andean mountains, with interesting findings related to processes of initial horticulture in central and southwest Colombia. But this trend has declined over the last decade. This presentation memorializes and acknowledges pioneers such as Ruth Gruhn, and promotes new opportunities for the future research of the amazing search of the first South Americans.

Lopez, Cira Martinez, Cira Martínez López (Instituto Nacional de Antropología e Historia) and Robert Markens (Universidad Nacional Autónoma de México)

[9] *La greca escalonada como símbolo del poder político en Oaxaca prehispánico*

Debido a que la greca escalonada es uno de los motivos más perdurables y ampliamente difundidos en el tiempo y espacio mesoamericano, su significado ha despertado desde hace tiempo el interés de varias generaciones de estudiosos. Por su forma geométrica y abstracta, el signo se presta a una gran diversidad de interpretaciones. Esta presentación tiene la finalidad de acercarse al significado de la greca escalonada en objetos del arte e inmuebles en Oaxaca prehispánico mediante un análisis de documentos coloniales y creencias de los pueblos tradicionales que quedan vigentes.

López, Francisco [337] see Balcarcel, AnaBeatriz

Lopez, John (Skidmore College)

[179] *Tenochtitlan: A Cultural History of Water*

Located today in Chicago's Newberry Library, the 1524 Nuremberg Map, representing the prehispanic city of Tenochtitlan on the eve of its conquest to Hernán Cortés, is an ink-and-watercolor image on paper, measuring 47.30 × 30.16 cm. Produced by an anonymous author in an unknown workshop in the German city of Nuremberg, it first appeared in the Latin edition of Cortés' Second Letter to the Spanish monarch Charles V. It is the earliest printed map of a New World city and although it is a highly Europeanized image of the Aztec capital, the map is believed to have been based on a now-lost drawing made by the hand of an indigenous author. A fish-eye perspective, valued for depicting large geographic areas such as cities, it provides the viewer with a 360-degree view of the precolumbian city and its surrounding aquatic environs. Much has been written about the Tenochtitlan's religious and political history, but water as a methodological lens to scrutinize the city's social and cultural history has received considerable less attention. Through study of historical images, this paper explicates the undergirding currents of water to Tenochtitlan's attitudes toward its public sphere.

López, María Laura (CONICET-FCNyM, Universidad Nacional de La Plata) and María Teresa Planella (Sociedad Chilena de Arqueología)

[388] *Chenopod Data in Two Countries of South America: Advances in Knowledge about the Use of Chenopodium in Argentina and Chile from Early Holocene (9000–11,000 BP) to Historical Times (250 BP)*

Argentina and Chile are the most austral American countries where Chenopodium species are recovered in several archaeological contexts. In both countries from the north to central and south, various issues are addressed from these findings such as hunter-gatherers subsistence strategies and chenopod grain morphological changes. Multi-proxy methods are used based on pollen, macro and micro botanical remains analyses, and isotopic data. However scarce botanical evidence has carried an uneven depth studies about the ancient presence of chenopod species, in particular quinoa grains, in the different regions. The objective of this contribution is to present the complete evidence about the presence and consumption of Chenopodium in Argentina and Chile remarking on new data. Advances in research have allowed knowing the manipulation of wild chenopod since early times and probably the development of different practices related to protection, transplantation, selection, and processing techniques. In this way the adoption of domesticated chenopod could have been easier among the first farmer and horticultural societies that lived far from the domestication centers. New issues are raised to be solved with future research, following the aim to get better insights into this pseudo cereal and preserve its cultivation in both countries.

Lopez Bravo, Roberto (Universidad de Ciencias y Artes de Chiapas) and Elizabeth H. Paris (University of Calgary)

[218] *The Jovel Valley of Highland Chiapas from the Classic Period to the Postclassic Period*

In contrast to the sociopolitical instability and depopulation observed at many sites in the Southern Maya Lowlands during the Classic to Postclassic transition, Highland Chiapas was characterized by stability and demographic expansion, as suggested by our excavations in the Jovel Valley, where small cities and towns maintained their roles as political and economic centers throughout this period. In this paper, we examine patterns of continuity

and change evidenced by recent excavations at the cross-valley monumental centers of Moxviquil and CV-38 (San Pedro y San Pablo). Founded near the beginning of the Late Classic period, these centers experienced a period of prosperity during the Early Postclassic, marked by the expansion of residential settlement into new areas. The occupation of domestic spaces for multiple generations is reflected in numerous building phases and renovations to residential terraces and houses. Both sites are characterized by distinctive architectural building styles that combine adobe and masonry techniques, including an adobe ball court at CV-38, and the use of adobe brick foundation walls and puddled adobe floors in outlying residential areas. We also observe a significant transformation in burial practices during this period, from rectangular masonry tombs to communal graves in mortuary caves.

Lopez Bravo, Roberto [322] see Meanwell, Jennifer

López Corral, Aurelio (Instituto Nacional de Antropología e Historia), A. Gabriel Vicencio (Universidad de las Américas, Puebla), Bianca L. Gentil (Penn State University) and Nora A. Pérez Castellanos (Instituto Nacional de Antropología e Historia, CNC)
[215] *The Geopolitical Implications of Sub-flow Variation within the Zaragoza-Oyameles Obsidian Source*

Chemical analysis of obsidian is a useful proxy for studying the control of obsidian goods exchange and the presence of prehispanic geopolitical boundaries. Recent studies on obsidian sourcing show that during the Late Postclassic period (AD 1250–1519), regional altepeme imported obsidian from several sources within highland Mesoamerica. Analysis of data suggests that no single political entity fully controlled the distribution of obsidian goods from a particular source, suggesting that perhaps a single obsidian source was geopolitically exploited by several rival altepeme. In order to examine this issue, we used pXRF analysis to analyze variation in sub-flow chemical signatures of 20 locations within the Zaragoza-Oyameles source area (located in Puebla, Mexico). Results were then compared to chemical signatures of archaeological obsidian artifacts from Late Postclassic sites of the Puebla-Tlaxcala region. Here, we present our preliminary results with special reference to the economic relationship between competing rival political entities.

López Corral, Aurelio [7] see Ibarra, Thania

López Corral, Aurelio [322] see Xiuhtecutli, Nezahualcoyotl

López Hernández, Karina [225] see Chávez Balderas, Ximena M.

López Luján, Leonardo (Museo del Templo Mayor, INAH)

[225] *Starfish in the Offerings of the Great Temple of Tenochtitlan*

Recent excavations carried out by the Templo Mayor Project in Tenochtitlan's sacred precinct uncovered a significant number of calcium carbonate plates, which, in spite of their advanced degree of deterioration, can be identified as consisting of the endoskeletons of sea stars. These organisms belong to the Asteroidea (from the Greek aster: "star" and eidos: "in the shape of") class, most of which exhibit radial symmetry and have thin, discernibly pentagonal bodies. Sea stars inhabit marine environments in nearly all longitudes and latitudes. Among the excavated plates, five species have been identified thus far: *Astropecten duplicatus* from the Atlantic, and *Pentaceraster cumingi*, *Nidorelia armata*, *Luidia* cf. *superba*, and *Astropecten regalis* from the Pacific. These remains were found in seven caches (Offerings 124, 126, 136, 137, 141, 163, and 166) deposited in the Templo Mayor, all of them corresponding to Phase VI (1486–1502 CE).

[225] *Chair*

López Luján, Leonardo [225] see Favila, Mario

Lopez Mestas Camberos, Martha Lorenza

[23] *Las piedras verdes en el Centro de Jalisco*

Los objetos trabajados en una extensa variedad de piedras verdes fueron altamente apreciados por las culturas mesoamericanas desde tiempos tempranos. Lo anterior aplica para el Occidente de México, en donde su uso se encuentra ligado a las actividades económicas, rituales y políticas realizadas por las elites, desde el Formativo medio, documentado en sitios de los complejos Capacha, El Opeño y Pantano, y generalizado a partir del Formativo tardío entre los grupos pertenecientes a la tradición de tumbas de tiro, momento en el que parece generalizarse un estilo propio de la región. A partir del Clásico tardío, es decir, a partir de la manifestación de una nueva tradición cultural conocida como complejo El Grillo, el trabajo y las redes de intercambio de las piedras verdes sufrieron cambios notorios, que parecen ser reflejo de las transformaciones mayores que se presentan en esta región. Este trabajo versará sobre los usos sociales de las piedras verdes y sus cambios desde el Formativo temprano al Epiclásico.

López Rivera, Alma Gabriela [120] see Carr, Sean

López Sánchez, Pablo Daniel [328] see Silis García, Omar

Lopez Varela, Sandra (UNAM)

[178] *Technologies and the State: Analyzing the Impact of Economic Growth through Archaeological Science*

Mexico's government attempts to eradicate poverty through infrastructure building and welfare policies have changed the social dimension of griddle and basket making at Cuentepec, in the State of Morelos Mexico. For generations, the house embodied the knowledge of making griddles and baskets, evoking people to remember fragments of the social practices of distant pasts and collectively lived histories. The act of remembrance is compromised with the building of welfare landscapes. Memory is intimately linked with the landscape, as it creates a sense of place that legitimizes the many identities and social worlds that have existed through time. In this hybrid landscape of welfare and memory, we characterized the technology of griddle making and approached the spatial and chemical analysis of residues left by the cycle of activities that interweave domestic tasks with production for more than a decade. In addition, we introduced a social impact assessment to our study to corroborate our findings. Results from these investigations provide a framework for evaluating the potential of applying archaeological science to analyze the impact of economic growth to the preservation of ancient technologies.

Lopiparo, Jeanne (Rhodes College)**[80]** *Night and the Underworld in the Classic Period Ulúa Valley, Honduras*

As the sun set and the light dimmed in the Classic Period Ulúa Valley, Honduras, the nighttime sky and a soundscape of nocturnal animals emerged. The transition between day and night was marked not only by the shifting sensory experience of the nightscape but also by the passage of the sun through the underworld, as the realm of death and the ancestors came alive. The night was inhabited and animated by liminal animals and ancestors that moved between the world of the living and the dead. The prevalence of representations of animals that are nocturnal, crepuscular, and/or associated with the underworld in the corpus of figural artifacts, and especially those associated with life-cycle rituals, suggests that the nighttime was crucial to everyday life, death, and renewal. Their animal (and sometimes zoo-anthropomorphic hybrid) bodies were frequently whistles, which would have animated a soundscape that accompanied transition-marking events. Solar and life-cycle rituals on the monumental scale featured large figural censers that heralded the passage between life and death, which—at night—became a two-way journey between the earthly world and the underworld.

Lorca, Rodrigo [231] see Rivera, Francisco

Lorenz, Samantha [11] see Saldana, Melanie

Lorenzi, Varenka [354] see White, AJ

Lorenzo, Francisco [62] see Silva, Rosicler

Lorey, Andrew (University of Cambridge)**[374]** *Toward a Unified "Heritage Ecology": Developing a Systems-Based Approach to Research in Archaeology and Heritage*

Archaeologists and researchers in heritage-based disciplines frequently study the complex interactions between human societies and natural environments. All too often, however, research proceeds from the premise that natural patterns, stressors and events promote direct cultural changes or adaptations on the part of human societies. Instead of perpetuating this linear and causal understanding of the relationships between nature and culture, this paper develops a new, holistic framework that encourages researchers to understand cultural and natural elements as part of a broader network of multidirectional associations and connections. In order to break down this false opposition between nature and culture, the paper expands upon previous definitions of "heritage ecology" and provides a new conceptual model that facilitates the analysis of agentive and multidirectional interactions between natural and cultural forces and actors. Dividing this model into three types of components—fabrics, elements and actors—the paper then applies a "heritage ecosystem" approach to a case study in the Pacific island nation of Vanuatu. The paper concludes by offering suggestions as to how researchers may employ the framework within other research settings.

Lorusso, Michael [301] see Schleher, Kari

Losey, Robert (University of Alberta)**[340]** *Living with Reindeer in Arctic Siberia: The View from Arctic Yamal, Russia*

Reindeer are an essential part of daily life and special events across a broad stretch of northern Eurasia, but their long-term history with people has remained elusive. Ethnographers have characterized reindeer as living in "intermittent co-existence" with humans, or as "semi-domesticates," "pastoral herd animals," and even "slaves." Archaeology has struggled to characterize human-reindeer relationships, with even the geographical origins of modern domesticated deer remaining unclear. The Yamal Peninsula of Arctic Siberia has a remarkable record of human interaction with reindeer, including habitation sites with abundant deer remains, harness equipment dating back 2,000 years, and a rich iconography in which these animals are commonly depicted. This paper presents our ongoing efforts to integrate these sources of information to produce an enriched understanding of human-reindeer engagement in the Siberian north. Described in the presentation will be preliminary results of zooarchaeological analyses of the region's faunal assemblages, and experimental work with replicas of the reindeer harness equipment from several sites in Yamal. These technical studies are discussed using a theoretical perspective that envisions domestication as an ongoing, multidirectional, and multispecies process that involves changes in genotypes and phenotypes, but that also involves sociality, shared labor, and numerous crafts.

[228] *Discussant*

Losey, Robert [35] see Fleming, Lacey

Losier, Catherine (Memorial University)**[93]** *Discussant***Loubser, Johannes (Stratum Unlimited, LLC)****[175]** *Recording and Interpreting Mississippian Rock Imagery at Painted Bluff, Alabama*

As part an overall effort by the Tennessee Valley Authority to conserve, manage, and present Middle Mississippian era pictographs and petroglyphs to a visiting public, Stratum Unlimited recorded 101 motifs from 47 panels at Painted Bluff, a steep south-facing limestone cliff overlooking the Tennessee River in northeastern Alabama. Results from the recording include an assessment of pictograph and petroglyph techniques, types and numbers of motifs, stratigraphic overlap and sequencing of techniques, and identification and interpretation of certain motifs.

Loughlin, Michael L. (University of Kentucky)**[320]** *Classic Period Architectural Variation and Interregional Interaction: A View from the Tres Zapotes Hinterland*

During the Protoclassic (AD 1–300) and Early Classic (AD 300–600) periods, the Eastern Lower Papaloapan Basin (ELPB) experienced an important reorganization. The political influence of the large center at Tres Zapotes began to wane and a series of new centers were established across an increasingly independent, but fragmented political landscape. Eschewing the architectural cannons of the Tres Zapotes polity, these new centers are characterized by diverse configurations revealed by pedestrian survey and lidar mapping, many of which feature monumental platforms and/or "Standard Plan" layouts, architectural forms more common in Central and South-Central Veracruz. I argue that the use of these nonlocal styles reflects a

reorientation of interregional interaction in the ELPB toward the large polities in Central Veracruz, such as Cerro de las Mesas. These interactions are further evidenced by the appearance of Mixtequilla style ceramics in the ELPB during the Early Classic period.

[320] Chair

Loughlin, Michael L. [320] see Pool, Christopher A.

Loughmiller-Cardinal, Jennifer [287] see Cardinal, J. Scott

Loughmiller-Cardinal, Jennifer (University at Albany, New York)

[392] *They Are What They Eat: A Need to Know More about Diet through Residues, Hieroglyphic Texts, and Images of the Classic Mayas*
Among the various sources of information about what foodstuffs comprised the Classic Mayan diet, we lack resolution on daily, domestic, and the various ritual and event foodstuffs. Beyond the archaeologically recovered macrofossil and faunal data, the identifications of drugs and ritual foodstuffs are less well established. Speculative and presumed behaviors that surround these goods tend to bias methods of analysis toward known substances and preconceived interpretations, thereby potentially obscuring empirical data on actual behavior. In the case of the “chocolate vases,” the residues did not match our assumptions. Are there other assumptions we have made that maybe leading us astray? There are a number of other residues and contexts to which we should be paying special attention, and we need more appropriate methods of acquiring residues from limited-preservation soils and contexts.

Louys, Julien [180] see O'Connor, Sue

Lovata, Troy (University of New Mexico)

[192] *Manito Trail Arborglyphs: Expressions of Place and Conceptions of Wilderness in Historic Graffiti from New Mexico, Colorado, and Wyoming*

Chicana/o scholars Levi Romero and Vanessa Fonseca define the Manito Trail as a late nineteenth- through mid-twentieth-century diaspora of New Mexicans traveling to work across the state of Wyoming. Manitos labored in herding, ranching, farming, mining, and lumber extraction, as well as in-town jobs. Some returned to New Mexico annually while others made Wyoming their permanent residence; yet most never fully lost contact with their homeland. Although Wyoming has a small Hispanic population whose presence hasn't always been recognized by the public at large, there is a rich archive of literature, poetry, and music related to the Manito Trail. This presentation outlines an ongoing project recording the material culture of the Manito Trail—in the form of arborglyphs or historic graffiti left on aspen trees by sheep herders and other laborers in Rocky Mountain forests. Arborglyphs are found at both ends of the Manito Trail—in northern New Mexico and adjacent areas of Colorado as well as Wyoming. They are material evidence of the culture history of the region as well as a conduit to understanding people's conceptions of the wilderness, mountains, and forests in which they labored.

Love, Michael [391] see Guernsey, Julia

Lovis, William [21] see Albert, Rebecca

Low, Marika (University of Wollongong) and Alex Mackay (University of Wollongong)

[54] *The Organization of Hornfels Blade Production during the Early Later Stone Age (ELSA) in the Eastern Cederberg, Western Cape, South Africa*

The Early Later Stone Age (ELSA) represents the onset of sustained microlithic technology in southern Africa. The ELSA is, however, poorly defined with respect to its technological characteristics and organization. In this paper we identify key features of the ELSA at Putslaagte 8 (PL8) rockshelter in the south-west of southern Africa, dating ~25–22 ka. The assemblage features relatively expedient production of hornfels blades using natural ridges of cobbles from the nearby Doring River. A second, distinct component is the reduction of quartz-bipolar cores to very small sizes. We then examine evidence from the open-air site Uitspankraal 7 (UPK7) on the Doring River, which contains a similar hornfels blade production system to PL8. Differences between the PL8 and UPK7 assemblages suggest an organizational system involving the staged production, use and discard of artifacts in different landscape settings. Hornfels blades appear to have been produced at the river and transported into the surrounding landscape, with limited transportation of cores. Quartz-bipolar systems, in contrast, appear to have involved local acquisition, reduction and discard of non-riverine rocks. Intriguingly little evidence of quartz-bipolar was found in the open-air sample, raising the possibility that different ELSA technological components were organized in distinct patterns at the landscape-scale.

Lowe, Lynne (Centro de Estudios Mayas, UNAM)

[292] *Génesis del Museo Yucateco durante el Segundo Imperio (1863–1867)*

El presbítero Crescencio Carrillo y Ancona fue un destacado intelectual yucateco y precursor del estudio científico de la arqueología maya, que culminó sus esfuerzos con la inauguración del Museo Yucateco en 1871 en base a sus propias colecciones. El análisis de diversos documentos de archivo ha hecho posible conocer los antecedentes de tal institución durante el Segundo Imperio mexicano. El emperador Maximiliano mostró un notable interés por la historia y las culturas indígenas, al igual que la emperatriz Carlota, quien realizó una visita a Yucatán en 1865, acompañada por el padre Carrillo, apreciando la importancia de conservar los sitios arqueológicos, así como de fundar un museo local. Como resultado de ello, en 1866 el Comisario Imperial de Yucatán decreta la creación del museo e instala una Junta de Arqueología y Artes que establecería los lineamientos para su formación a partir de la donación de piezas “tales como vasos o trastos, figurillas, ídolos, estatuas, piedras esculpidas o grabadas, cascabeles, planchuelas de metal, armas, instrumentos, adornos, ornamentos, libros, pieles pintadas o mapas,” además de proteger y registrar el patrimonio material. La caída del Imperio al año siguiente frena la realización del proyecto, que tiempo después se concretaría con apoyo del gobierno federal.

Lowman, Shannon, Nicola Sharratt (Georgia State University) and Bethany L. Turner (Georgia State University)

[233] *Social Transition at Tumilaca la Chimba: A Bioarchaeological Analysis of Terminal Middle Horizon and Late Intermediate Period Mortuary Contexts*

The centuries following Tiwanaku state decline circa AD 1000 were characterized by political fragmentation and social flux. In the Moquegua Valley, Peru, the first 250 years following the state's demise are referred to as the terminal Middle Horizon (AD 1000–1250), a period during which considerable

cultural continuity with Tiwanaku is evident despite political collapse. The following Late Intermediate Period (LIP) (AD 1250–1450) is marked by major changes in material culture, domestic architecture, and ceremonial practices as the valley likely underwent a process of population replacement. Drawing on skeletal data from one site (Tumilaca la Chimba) with both terminal Middle Horizon and LIP occupations, this poster examines stress and health across this turbulent transition. An osteological analysis of 20 individuals from the terminal Middle Horizon cemeteries and 23 individuals from the LIP period cemetery reveals significant differences in age and sex distributions and in differences in dental and skeletal pathologies between the two periods. These results provide insights into nutritional stress and disease exposure between these two occupations and underscore the importance of a bioarchaeological perspective in understanding the impacts of major social and political transition in the Andes.

Lowry, Justin [326] see Paling, Jason

Lowry, McKenzie

[124] *Seismic Mitigation for Collections at the J. Paul Getty Museum through Mountmaking*

As recent earthquakes in Oklahoma and Virginia have shown, even regions generally thought to be far from seismic zones are never truly immune to their effects. The development over the last 30 years of seismic mount systems that safely capture objects in 360 degrees can offer solutions relevant to collections in a diversity of environments. Focus on this goal for the past few decades has led to a realization that more can be done to protect collections in advance of threats, leading to the evolution of mountmaking as a form of preventative conservation. This paper will examine how modern mountmaking can mitigate destructive forces for collections on display. Examples of earthquake damage to collections will be examined and discussed in conjunction with modern preventative techniques, both simple and complex.

Loyola, Rodrigo, Isabel Cartagena (Facultad de Ciencias Sociales, Departamento de Ant) and Lautaro Núñez (Instituto de Arqueología y Antropología, San Pedro)

[134] *Tecnología lítica y movilidad durante el poblamiento temprano del Desierto de Atacama Meridional (Chile)*

Actualmente se reconoce que los grupos humanos que colonizaron el Desierto Meridional de Atacama (22–25°S) desde la transición Pleistoceno tardío-Holoceno temprano (12.6–10.2 ka AP) accedían a la amplia diversidad de ambientes disponibles en este árido paisaje. Desde los oasis de borde de salar, los paleohumedales y quebradas de la precordillera, hasta los paleolagos de la alta puna, estos espacios fueron articulados a través de circuitos de movilidad estacional. Por otro lado, la colonización de esta parte del desierto también fue un proceso biogeográfico estructurado en el tiempo. A medida que se dispersaban por el territorio, los grupos de cazadores-recolectores seleccionaron, incorporaron y se adaptaron paulatinamente a los nuevos ambientes. El registro lítico -estrechamente vinculado a la dimensión espacial de los grupos humanos- nos brinda una entrada excepcional para evaluar los cambios ocurridos durante este proceso. A través de la comparación de conjuntos líticos de contextos tempranos, planteamos que la variabilidad de los sistemas técnicos y los cambios en las estrategias de movilidad responden a un proceso continuo de aprendizaje, en el cual los grupos acumularon información del entorno y desarrollaron un conocimiento acabado del paisaje.

Lozada Mendieta, Natalia (MPhil Student/PhD candidate UCL-Institute of Archaeology)

[327] *Ceramic Variability and Social Interaction in the Middle Orinoco: On Multiethnic Communities and Ceramic Traditions in the Late Occupation Period (500–1500 AD)*

The Átures Rapids in the Middle Orinoco region are mentioned in the historical sources as a key trading center linking the Western Llanos of the Orinoco and the Guyana, where people, goods and ideas were exchanged. A recent study in Picure Island, located in the rapids, present a variety of ceramic temper wares, beads and quartz crystals associated in stratigraphically excavated contexts. The ceramic sherds recovered in Picure are closely related to other archaeological sites in the Middle Orinoco. Besides the presence of common ceramic traditions and complexes, it confirms a dual temper ware assemblage for the late occupation composed by the Arauquinoid and Valloid ceramic traditions. Both traditions exhibit distinctive temper wares and stylistic traits that under the normative approach have been related with different cultural groups. Nonetheless, both have been associated with Carib speaking parties and in certain contexts appear to share decorative motifs, usually explained as a product of contact and diffusion. From a communities of practice perspective, the characterization of technical traditions through macroscopical and microscopical analysis of ceramic sherds from Picure intends to contribute novel insights to the discussion of how to understand ceramic variability in a multiethnic interaction context in prehispanic times.

Lozano, Sergi [165] see Fernandez-Lopez de Pablo, Javier

Lozano, Stephanie (University of California, Riverside)

[298] *Teotihuacán Influence in the Maya Area as Documented by Archaeological Fieldwork and Museum Collections*

There is extensive evidence of the exchange that occurred between Teotihuacán and the Maya area and new evidence has continued to surface in recent archaeological literature and in museum collections. This paper has several main objectives, first to revisit the history of research and analysis of iconographic symbols and epigraphy within the Maya area that notes a Teotihuacán influence. Secondly, to point out that the Maya obtained Central Mexican symbols and writing not merely for their exoticness but rather for what they represented as powerful instruments used within sacred ritual activity at Teotihuacán. Finally, this investigation offers new perspectives found within museum collections on cultural and ideological exchange between Teotihuacán and the Maya.

Lozano Bravo, Hilda (UNAM, Estudios Mesoamericanos.)

[353] *Life on Floors: The Archaeometry of Teotihuacán's Living Surfaces*

Archaeometric studies promote interdisciplinarity. Therefore, through this framework we can analyze other materials which facilitate the understanding of the society which created, modified, and used them. To sum up, with this methodology we seek to comprehend the characteristics of the materials used to build the city of Teotihuacán. Currently, there are archaeomagnetic studies underway which intend to discover the Sun Pyramid Square's chronology of occupation. Furthermore, we are also conducting physical analyses that aim to understand the floor structure; some of these include optical microscopy, SEM, XRF, FTIR, Raman, and Pixe. Moreover, these analyses are being complemented by the identification of the floor's mineralogical composition through soil micromorphology. In fact, we were able to identify similarities and differences between the materials used in the manufacture of floors. That is to say, that this discovery may indicate that preferences toward certain raw materials could be related to the technological advances that were achieved over time in Teotihuacán. Finally, we propose that these studies suggest that the same surfaces which were used in prehispanic times are themselves an archaeological material that must be taken into account to reconstruct the history of this place.

Lu, Baorong [78] see Pan, Yan

Luan, Fengshi [76] see Underhill, Anne P.

Lubinski, Patrick (Central Washington University) and Thomas Hale (Central Washington University)

[191] *Identifying and Siding the Stylohyoid Bone for North American Artiodactyls*

The stylohyoid is the largest bone in the hyoid complex surrounding the throat in artiodactyls. There is little published information to allow its identification to species or anatomical side. Our study examined comparative stylohyoid bones in order to provide criteria for taxonomic identification, using more than 350 animals representing 13 species present in the continental United States. Based on osteometrics and discrete features, the bone can be distinguished to species for most of these through an iterative set of comparisons, but with variable degrees of confidence. For example, a bone could be sorted into the small artiodactyl group based on maximum length with 99% success (n = 304), and a pronghorn specifically based on its S-shaped dorsal aspect with 99% success (n = 223). Other species, like small bovids and deer, are harder to separate with confidence, but fair results are obtained with some measures (e.g., deer species can be separated using anterior end width with 72% success in a sample of 76). Our study also extracted stylohyoids in place in order to provide criteria for siding, using 29 carcasses representing 8 species, and found it can be readily sided based on a marked concavity on the lateral side.

Lucas, Virginia (University of Nevada, Las Vegas), Claira Ralston (University of Nevada, Las Vegas), Anna Osterholtz (Mississippi State University), Andre Gonciar (Archaeotek Canada) and Angelica Balos (Ministry of Culture, Hunedoara County, Romania)

[294] *Sacrifice or Feasting: Fauna Interpretations of the First Iron Age Romanian Commingled Assemblages at Măgura Uroiului*

The Magura Uroiului rock formation, located at the confluence of the Mures and Strei Valleys, is a natural, dominating fortress on the landscape. This rock formation has been utilized by groups including, the Hallstatt, Celtic, and Late Iron Age Dacian. The focus of this presentation is the First Iron Age mortuary monument located at the base of the rock face. This monument yielded both human and animal remains, with primary and secondary burial practices of the human remains occurring. The monument was excavated over seven field seasons and both wild and domesticated animals were present. Following the analysis of the faunal remains, evidence of feasting and sacrifice were observed. The presence of these activities as well as burial objects present within the mortuary monument suggests increasing social stratification among this population group.

Lucero, Gustavo [91] see Castro, Silvina

Lucero, Lisa (University of Illinois at Urbana-Champaign)

[20] *Discussant*

Lucet, Genevieve (IIE-UNAM)

[217] *Spatial Roles in Cacaxtla: A Delineation from the Study of Its Architecture*

The archaeological site of Cacaxtla, in the central highlands of Mexico, had its heyday during the Mesoamerican Epiclassic period. Its architectural characteristics define it as a place for residential and government activities, in contrast with the neighboring hill Xochitecatl, where constructions typify ritual purposes. Excavations were not accompanied by scientific studies of materials for the understanding of functions of rooms, porches, and courtyards that make up the site. Therefore, it is necessary to resort to other sources of information derived from the analysis of structural, spatial, and formal features of these buildings in order to obtain hypotheses about their spatial roles. The observable diversification of built spaces corresponds to different design solutions applied in order to meet different needs. By defining and describing these features, we will distinguish some aspects of these needs and try to derive possible spatial roles. To perform this analysis, we will review the spatial composition of the site, the formal characteristics of rooms and courtyards, connections, and visual communication between the constructions and with the environment, the different formal solutions of the facades, the presence of hearths and altars and, of course, the spectacular murals as essential elements of meaningful characterization of the architecture.

Lueth, Friedrich [224] see Heilen, Michael

Luin, Camilo [298] see Beliaev, Dmitri

Lujan Dávila, Milton [358] see Praet, Estelle

Lukas, Dominik (Department of Anthropology, Stanford University) and Claudia Engel (Department of Anthropology, Stanford University)

[73] *Changing Technologies, Changing Practices: The Transformation of the Çatalhöyük Research Database*

Since its beginnings, the Çatalhöyük project has stood out as an early adopter of latest innovations in information technology and digital recording solutions. Consequently, a considerable effort went into keeping the technology infrastructure on site up to date, incorporating new developments, and ensuring compatibility of applications. A core component of the Çatalhöyük technology infrastructure is a central database which hosts textual and numeric records of the excavation. Excavation and Specialist teams enter data through highly customized desktop interfaces. As the teams' research goals, interpretations, and practices evolve, the database developer generates the code to implement changing requirements in the interfaces—usually during the excavation season in a very short turnaround time. Over the course of the project each of these digital humanist developers has left traces not only in the featureset and functionality of the system, but also in the source code of the application itself. In this paper we will analyze this code with qualitative and Natural Language Processing methods. We will try to unravel how technological advances and ever evolving archaeological research practices are mirrored in the history of the Çatalhöyük central database code.

Lulewicz, Isabelle (University of Georgia), Victor Thompson (University of Georgia) and Thomas Pluckhahn (University of South Florida)

[286] *Shell Mound Architecture and Cooperative Mass Oyster Collection on the Central Gulf Coast of Florida, USA*

Coastal fisher-gather-hunters often have a deep connection among their ritual practices, economic systems, and the built environment. Emerging trends and traditions of cooperation within forager communities can have lasting impacts on group social organization and can be instrumental in the development of early villages. The Crystal River region of the Gulf Coast of Florida, USA provides an interesting locale to explore the intersection between shell mound architecture and cooperative mass capture of estuarine resources. To so do, we combine our recent research on the temporality of village life and monument construction, habitat exploitation practices, and ethnographic example in order to model the emergence of cooperative

systems in the context of these larger traditions (e.g., monument construction). The results from our recent research provide insight into patterns of behavior that are suggestive of habitual cooperation at multiple temporal and spatial scales.

Lulewicz, Jacob (University of Georgia)

[197] *Sociopolitical Networks and the Transformation of Southern Appalachian Societies, AD 700–1400*

This paper investigates how processes of societal transformation, including the emergence of sociopolitical hierarchies and socioeconomic inequalities, are shaped by the scale and structure of social networks. Across Southern Appalachia, during more than seven centuries of population growth and sociopolitical change, two distinct regional political traditions emerged in what are today northern Georgia and eastern Tennessee. Employing data on social signaling practices as materialized in ceramic traditions and ritual paraphernalia, this study compares changes to network topologies across the two regions to contextualize differences in long-term sociopolitical development. Using formal network analytical methods, this paper tracks the historical development of network structures to evaluate the emergence, and underlying organization, of two distinct sociopolitical traditions.

Lulewicz, Jacob [163] see Thompson, Victor

Luna Erreguerena, Pilar [140] see Chatters, James

Lundquist, Lance and Chris Jenkins

[351] *Section 106 Mitigation in Memorandum of Agreements: A View from the Corps*

What constitutes acceptable Section 106 mitigation to resolve adverse effects under the National Historic Preservation Act? Stipulations in a Section 106 Memorandum of Agreement (MOA) need to be enforceable, with sufficient specificity and accountability for an Agency to monitor compliance. Are there limits to what is possible in Stipulations in Section 106 MOAs? This paper uses examples from the U.S. Army Corps of Engineers' Regulatory Program-permitted projects to explore the concept and application of mitigation in Section 106 MOAs.

Lundquist, Lance [351] see Jenkins, Chris

Luo, Wugan [33] see Gilstrap, William

Luo, Yunbing (Hubei Provincial Institute of Cultural Relics and Archaeology, Wuhan, China)

[116] *New Observations on Antlers from Chu Tombs*

Lacquered artifacts unearthed from Chu state tombs represent the highest achievements of the lacquer industry in the Eastern-Zhou period (770–221 BC). Antlers form an important part of several typical Lacquered wood-wares unearthed from large and medium-sized Chu Tombs. Antler-wares mainly belong to three categories: 1) tomb-protecting beast (with two or four antlers inserted on the head), 2) lacquered wooden flying birds with tiger-shaped bases (with two antlers inserted on the bird waist), and 3) lacquered wooden crouching deer (with two antlers inserted). The antlers are identified mainly as sika deer, followed by David's deer. Tombs with sika deer antlers were medium-sized tombs. David's deer antlers were only found in large-sized tombs. The presence of David's deer antler artifacts, especially adult antlers with many branches, may be related to the high social status of the tomb owners. The lacquered wooden-wares may have used real antlers because the Chu people esteemed deer. They thought antler was a symbol of strength and could be used to protect the tomb and keep evil out. Antlers may have also been a symbol of the wind that could guide the soul. I think these meanings may be connected with the natural phenomena of antlers annually shedding and regenerating.

Lupo, Karen [85] see Bakke, Gwen

Luque-Talaván, Miguel (Universidad Complutense de Madrid)

[36] *The Innovations that Traveled to the Philippines: An Approach to the Biological Conquest of the Islands (Sixteenth–Eighteenth Centuries Centuries)*

Every process of discovery, conquest and colonization, regardless of its magnitude and historical implications, entails a transformation in those societies in which it takes place. The Philippines, as it had already happened to other parts of the world before, was no exception. The conquest of the Philippines Islands by the Spanish Monarchy supposed the transformation of a very important part of the indigenous population of the islands. In this occasion we studied the biological conquest of the islands and the impact between its inhabitants and its ecosystem. Analyzing those exogenous elements that, traveling on board of the Manila Galeon, contributed to the island's life. That's exactly what we call ecological impact of the conquest, derive of the introduction of new proceeding farming from Spain or from the Spanish American possessions, as well as agriculturalist and cattle raising new technics. The other subject of our study is the demographic impact that conquest and colonization processes had on the indigenous population. Not only because of the diseases transmitted to them, but also because of the forced movements of population; as well as the European and African migration and its consequent miscegenation or mestizaje with the American indigenous population.

Luzzadder-Beach, Sheryl [83] see Beach, Timothy

Luzzadder-Beach, Sheryl (Department of Geography and the Environment, University of Texas at Austin), Timothy Beach (Department of Geography and the Environment, Uni), Nicholas Dunning (Department of Geography, University of Cincinnati), Vernon Scarborough (Department of Anthropology, University of Cincinnati) and Fred Valdez (Department of Anthropology, University of Texas at)

[83] *A Quarter-Century of Exploring the Three Rivers Watersheds in Belize*

The Programme for Belize Archaeological Project is situated in the heart of the Three Rivers Watersheds, drained by the Rio Bravo, Booth's River, and Rio Azul/Blue Creek in northwestern Belize. These three river systems, along with groundwater, springs, and wetlands, nurture what is today the tropical rainforest refuge of the Rio Bravo Conservation Management Area, active farming communities, and long ago sustained multiple ancient Maya communities such as La Milpa, Dos Hombres, Chawak But'o'ob, Maax Na, Blue Creek, Grey Fox, and others. Comparatively little is known about tropical river systems in Central America. The Three Rivers have been an ideal laboratory in which to study the availability and quality of water for ancient Maya communities, the hydrologic advantages and challenges faced in the past, and to understand the sustainability of these resources for today's inhabitants. This paper traces ancient Maya water use research undertaken over the last quarter century, and offers insights gained from

multiple environmental methods and proxies, including water chemistry, sediment chemistry, geoarchaeology, and remote sensing studies including a 2016 lidar survey.

Lv, Liangbo [58] see Lam, WengCheong

Lycett, Mark (University of Chicago), Andrew Bauer (Stanford University), Mannat Johal (University of Chicago) and Marco Madella (Universitat Pompeu Fabra, Barcelona, Spain)

[325] *Six Thousand Years of South Asia: Implications for Climate Modeling.*

We review the archaeological evidence for land use patterning in South Asia over the past 6,000 years as part of a larger effort of the PAGES-supported Landcover6k and LandUse6k project to reconstruct global land use and land cover datasets for the purpose of improving models of anthropogenic land cover change used by climate scientists. Here, we use archaeological and paleoecological data from our study areas to trace land use shifts from the Southern Neolithic through the Middle or Precolonial Period and discuss their relationship to anthropogenic land cover change. Our data demonstrate an intensification and expansion of agricultural and pastoral land use during this period. We suggest that this pattern characterizes many regions of South Asia that these changes significantly altered both land cover and other environmental conditions during the mid to late Holocene.

Lyle, Robin (Crow Canyon Archaeological Center)

[142] *Two Episodes of Ritual Turkey and Dog Burials in Southwestern Colorado: A Case Study*

Many instances of turkey and dog burials have been documented in the prehistoric American Southwest. Some are simple burials or discarded remains but some examples bear characteristics of deliberate sacrifice, arrangement and elaborate ritual interment. Excavations directed by D. M. Dove from 2008 through 2012 in Early Pueblo II period contexts at the large Champagne Spring site in Dolores County, Colorado, revealed two unprecedented examples of this latter type. On or near the floors of two pit structures were complete skeletal remains of multiple turkeys, dogs and other animal remains systematically arranged and covered with sandstone slabs and rich cultural deposits. Orientation and association of the various skeletons clearly suggests symbolic meaning in each episode, as does the sheer number of otherwise healthy individuals including: day old turkey poults, puppies, a crow, cottontail rabbit, rattlesnake and several aged turkey hens with healed fractures. These two different episodes of elaborate, ritual burial occurred within a few meters of each other and a human generation apart but they both demonstrate significant, deliberate community scale sacrifice.

Lyle, Robin [142] see Lipe, William

Lyman, R. (University of Missouri Co)

[79] *Discussant*

Lynch, Sally (McMaster University)

[272] *The Role of Social Memory in Everyday Bodily Practices of Pottery Production and Consumption during the Late Moche Period (AD 500–800) on the North Coast of Peru*

Often the term “social memory” conjures up ideas of grand commemoration events such as statues, museums, large-scale construction and other public displays to remember the collective past. We must not forget, however, the seemingly mundane daily practices that help to create, maintain, and change society while simultaneously forming social identities. This study looks at the Late Moche period (AD 500–800) on the North Coast of Peru. It was a time of immense social, religious, and political change caused in part by environmental upheavals and foreign Highland influence. I propose to examine the role that bodily practices, in particular, pottery production and food consumption, have to play in the maintenance of a social past as well as future, particularly during periods of social unrest that characterized the Late Moche Period. The ceremonial center of Huaca Colorada in the Jequetepeque Valley provides ample evidence for both mundane daily practices, as well as more overtly commemorative and symbolic events of architectural reconstruction. This study will examine their intersection, as well as evidence of continuity and change in pottery production and food consumption that highlights the role of daily practices in the formation of social memory during the Late Moche period.

Lyon, Jerry (Tierra Right of Way Services, Ltd.) and Jeffrey Jones (Tierra Right of Way Services, Ltd.)

[105] *Cemeteries, Settlement Development, and Becoming Hohokam in the Northern Tucson Basin*

The transition from hunting and gathering to increased reliance on farming and the subsequent development of distinct regional cultural traditions represent critical processes in the prehistory of southern Arizona. Previous research at the site of Valencia Vieja in the southern Tucson Basin suggests the development of a distinct Hohokam cultural identity began during the Tortolita phase (Red Ware horizon) when significant population aggregation could be maintained and supported with dependable irrigation agriculture. As exemplified at Valencia Vieja, such population aggregation was expressed in a distinctive plaza-oriented spatial structure. Moreover, ideological and mortuary ritual patterns, agricultural strategies, and settlement hierarchies originating in the Tortolita phase appear to foreshadow subsequent Hohokam developments. Recent excavations at Early Ceramic period sites (Dairy, Richter, and Lonetree-Redtail-Coachline) within a 4-mile reach of the Santa Cruz River in the northern Tucson Basin provide additional information on sedentism and the emergence of a distinct, local Hohokam tradition. This paper addresses Hohokam origins in the Tucson Basin by examining site structure, occupational histories, and settlement development at three important Early Ceramic localities, two of which were anchored to large, enduring cemeteries.

[105] *Chair*

Lyons, Diane (University of Calgary)

[161] *Transferring Technological Styles: An Ethnoarchaeological Study of Marginalized Pottery Production in Tigray, Northern Highland Ethiopia*

The transfer of pottery making skills and knowledge is well studied in Africa using the chaîne opératoire methodology. Chaîne opératoire is understood as a social practice in which technological choices are guided by social choices that potters learn as members of a potter community. The complement of technological choices of this group of potters creates a unique technological style. Africanists use technological styles to study the history of potter communities through time and space. But what happens if the learning network is transferred to other people? This paper presents results from a regional study of pottery production in northern Tigray. Contemporary pottery production is an economic strategy of very poor women, who are socially marginalized for practicing a despised craft. However, historians argue that blacksmithing and pottery making in the northern highlands were monopolized by a Jewish subgroup called the Beta Israel, who formed an endogamous caste. Most Beta Israel were evacuated to Israel during and at the end of Ethiopia's civil war (1974–1991). Our study found a more complex social picture of pottery production than historians allow, and contributes to our understanding of the variability in the transfer of technological styles between diverse communities.

[314] *Discussant*

[161] Chair

Lyons, Kevin (Kalispel Tribe of Indians)

[350] *Problematic Pixels: Prehistoric Residential Floor Recognition in the Pend Oreille Valley*

Public archaeology, as constructed in the United States, is heavily invested in the efficient use of tax and rate payer moneys to identify archaeological sites. The form of that investment, typically, results in a well certified and experienced archaeological practitioner walking the land and/or systematically probing soils. Although well established, this approach is not without its conspicuous errors and project crushing missteps. With the recent proliferation of remote sensing datasets (e.g., lidar) and targeted use of additional methods, can site search failures be reduced and site discovery increase? If systematically applied upon a landscape scale, can such an approach improve needed efficiencies for both commercial and research oriented archaeology? The Kalispel Tribe shares its results of multi-modal search efforts for residential encampments and related phenomena on and adjacent to its reservation.

Lyons, Natasha (Ursus Heritage Consulting) and Anna Marie Prentiss (University of Montana)

[50] *Exploring the Status of a Roasting Feature Complex along the Mid-Fraser Canyon, Bridge River Site, British Columbia*

Roasting features were developed by First Peoples throughout North America to prepare and preserve food for winter storage during the mid to late Holocene. On the Interior Plateaus of British Columbia, Washington, and Oregon, these complexes are found at upland root harvesting sites and, to a lesser extent, in association with winter villages. This poster focuses on the interpretation of a dense complex of roasting features within a housepit at the Bridge River site, located on the Mid-Fraser Canyon of British Columbia, and dated to ca. 1200–1300 cal. BP. We explore the results of recent excavations within Housepit 54, and examine the size, shape, and structure of these pits in comparison to other complexes on the Canadian Plateau. We analyse the plant macroremains, determining what edible species were being processed, what vegetative matter was used in the cooking process, and what size and species of fuels were being used to cook these resources. These paleoethnobotanical analyses inform us about harvesting, subsistence, and preservation practices of ancient St'át'imc residents at this long-lived village complex, and the nature of their relationships with the landscape they lived in and to neighboring Interior Salish communities.

[172] Chair

Lyons, Natasha [172] see Supernant, Kisha

Lyons, Patrick (Arizona State Museum), Don Burgess (Arizona State Museum), Marilyn Marshall (Arizona State Museum) and Jaye Smith (Arizona State Museum)

[390] *Maverick Mountain Phase Ceramics from Point of Pines Pueblo: A Preliminary Report*

Emil Haury's 1958 synthesis of the Pueblo III–Pueblo IV period (AD 1265–1450) archaeology of Point of Pines Pueblo, in east-central Arizona, is the American Southwest's classic case study in how to reliably infer ancient migrations. Field school excavations conducted between 1946 and 1960 uncovered compelling evidence of immigrants from the Kayenta region of far northeastern Arizona and southeastern Utah. However, because the excavations at Point of Pines Pueblo have never been fully reported, the site's ceramic assemblage is not nearly as well understood as it should be. Since 2012, a team at the Arizona State Museum (University of Arizona) has been studying the pottery from Point of Pines Pueblo in order to shed new light on the immigrant occupation. In this paper, we report on the analysis of dozens of previously uncatalogued reconstructible vessels from key contexts at the site. These objects provide insight into interaction between Kayenta immigrants and those who harbored them as well as architectural changes at the pueblo. They also represent critical data for understanding formation process at the site and refining its chronology. Important from a regional perspective, many of these vessels illuminate the development of Pinedale Style.

[390] Chair

Lytle, Whitney (University of Texas at San Antonio)

[187] *Transformations within an Ancestor Shrine: New Discoveries from Group D—Xunantunich, Belize*

The concept of transformation is expressed by innumerable cultures and has been explored by archaeologists across the globe. The ritual act is often represented in Maya iconography as rulers and religious practitioners exhibiting their power through the ability to change into their animal uays. However, like individuals, spaces can undergo a process of ritual transformation. This paper examines the subject of transformation and how it is demonstrated through imagery and space within a Classic period Maya ancestor shrine at the elite residential unit of Group D, Xunantunich. I will discuss preliminary analyses of crypts discovered during the 2016 field season coupled with findings from the 2012–2015 investigations and how they represent various manifestations of the transformation theme. First, the re-signification of the shrine from its original function within the Late Preclassic can be seen as an act of transformation. Second, various secondary burials and at least one primary individual were discovered within a crypt containing grave goods which I suggest were meant to transform the burial space into the watery underworld. Lastly, a more traditional representation of this ritual ability is expressed iconographically on two carved shell gorgets found in association with a buried individual.

Lytle, Whitney [43] see Vara, Rachel

Lyu, Peng (Institute of Archaeology, Chinese Academy of Social Sciences, Beijing), Katherine Brunson (Brown University), Jing Yuan (Institute of Archaeology, CASS, China) and Zhipeng Li (Institute of Archaeology, CASS, China)

[116] *Zooarchaeological and Genetic Evidence for the Origins of Domestic Cattle in Ancient China*

This paper reviews current evidence for the origins of domestic cattle in China. We describe two possible scenarios: 1) domestic cattle were domesticated indigenously in East Asia from the wild aurochs (*Bos primigenius*), and 2) domestic cattle were domesticated elsewhere and then introduced to China. We conclude that the current zooarchaeological and genetic evidence does not support indigenous domestication within China, although it is possible that people experimented with managing wild aurochs in ways that did not lead to complete domestication. Most evidence indicates that domestic taurine cattle (*Bos taurus*) were introduced to China during the third millennium BC, and were related to cattle populations first domesticated in the Near East. Zebu cattle (*Bos indicus*) entered China sometime between 2000–200 BC, but much less is known about this species. The role of cattle as ritual and wealth animals seems to have been critical to their initial introduction.

Lyu, Shaowu (College of Life Sciences, Jilin University), Chunxue Wang (Research Center of Chinese Frontier Archaeology), Quanchao Zhang (Research Center of Chinese Frontier Archaeology), Lixin Wang (Research Center of Chinese Frontier Archaeology) and Ningning Liang (Research Center of Chinese Frontier Archaeology)

[116] *Identification of Adhesive on Bone-Handled Microblades from the Houtaomuga Site in Northeast China*

With the emergence and development of composite tools in the Upper Paleolithic, adhesives became one of the most widely used materials by early human societies. Of particular interest is to know which animal/plant species were being exploited for glue manufacturing. The Houtaomuga site, located in northeast China, provides favorable materials for the identification of organic residues; and a few bone-handled microblades were collected from this site. In this study, we scraped micro adhesive samples from bone-handled microblades and carried out FTIR and proteomics analysis to determine the protein components and precise origins. The identified signatures from tandem mass spectra of doubly protonated tryptic peptides match most closely to known horse collagen markers, suggesting the adhesive was an animal glue made from horse parts. These results reveal the diverse utilizations of horses at the site, which provided not only meat and hides, but also parts for manufacturing adhesive.

Ma, Mitchell (University of Toronto) and Hua Zhong (Harvard University)

[279] *Paleoethnobotany of Yangguanzhai*

Yangguanzhai is a valuable resource for paleoethnobotanists to understand human-plant interactions in Neolithic northwestern China due to its excellent conditions for the preservation of macrobotanical materials. In recent years, several paleoethnobotanical studies on Yangguanzhai have been carried out on site, yielding many results that greatly contribute to our understanding of Neolithic agriculture in the region. Presented in this paper are the results of two systematic flotations conducted in the vicinity of Yangguanzhai. The first is from a well-defined Neolithic house feature, and the second is from a Neolithic moat. The authors utilized a combination of horizontal and vertical sampling strategies to enhance the interpretative value of macrobotanical remains during collection, and the resulting studies were the first intra-feature analyses on Neolithic plant materials conducted in northwestern China. Our results demonstrate that the human-plant interactions at a typical archaeological feature can go through various functional stages and vary spatially. These studies show that inter- and intra-feature relationships can provide substantial context for understanding the diverse trajectories through which plants and human cultures developed in the context of Neolithic China.

Ma, Mitchell [279] see Wa, Ye

Ma, Xiao (University of California, Los Angeles), Yuli Shi (Department of Archaeology, the School of History), Herant Khanjian (Science Department, Getty Conservation Institute), Hui Fang (Department of Archaeology, the School of History) and Dayong Cui (Archaeological Institute of Jinan)

[78] *Characterization of Early Imperial Lacquerware from the Luozhuang Han Tomb, China*

This paper focuses on presenting the characterization of materials from fragmented pieces of an imperial lacquer plate in the Luozhuang Han tomb, which dates to the early Western Han dynasty. Various noninvasive and minimally invasive techniques were performed, including optical and electron microscopy, XRF, Raman spectromicroscopy, FT-IR, XRD, and THM-Py-GC/MS. The lacquerware pieces consist of a five-layer structure, which includes (from the top): a red pigmented layer, two lacquer finish layers, a ground layer, and a canvas/wood foundation layer. The red layer consists of ground cinnabar mixed with urushi. The lacquer finish layers are made of urushi mixed with perilla or tallow tree oil, without any pigment. The ground layer is a mixture of organic materials including urushi, tree oil and amorphous carbon (possibly burned ashes) and inorganic fillers such as quartz, albite, and potassium feldspar. Urushi was also identified in the canvas/wood foundation layer. Though highly degraded, the canvas is probably made of hemp (bast fibers). The identification of high concentration of drying oil indicates an intentional addition of oil into the urushi to retard the rate of hardening and to increase gloss.

Maass, Claire K.

[348] *The Body as Machine, the Body as Commodity, and the Body as a Temple: Treatments of Enslaved African Laborers on Buena Muerte Sugar Estates in Cañete, Peru*

From its arrival in Lima in 1709 until the abolition of slavery in 1854, La Orden de la Buena Muerte was among the largest slaveholders in the sugar industry of Cañete, Peru. Moreover, as an order explicitly founded to oversee the physical and spiritual well-being of marginalized communities, the Buena Muerte also played a critical role in public health programs throughout the region. These activities were grounded in fundamentally different, and often opposing, perspectives toward the treatment of persons of African descent. I argue that efforts to more fully understand the institution of slavery on Buena Muerte estates must account for the diverse economic interests and Christian values that shaped attitudes toward the treatment of enslaved African laborers. How did the Buena Muerte reconcile a model of exploitative control over the bodies, health, and standards of living of enslaved persons, with the ecclesiastical project of physical and spiritual salvation? What system of practices for controlling slave labor emerged from this negotiation, and how did it affect the health and well-being of the laborers themselves? To address these questions, I discuss preliminary historical and archaeological findings from ongoing research at one of the Buena Muerte's sugar estates in Cañete, Peru.

[64] *Discussant*

[348] *Chair*

MacDonald, Brandi Lee (University of Missouri Nuclear Research Reactor)

[216] *Ochre Quarrying as Placemaking in British Columbia*

In coastal and interior British Columbia, ochre was a key component of local traditional knowledge among hunter-fisher-gatherer communities. Ochre pigment quarries are found in alpine, lowland, and alluvial geologic deposits, and each are uniquely storied locations that carry ideas about history, tradition, and place. The procurement, trade, and use of ochre from each of those locations is deliberate, and embedded within a complex set of ideas and decision-making. Provenance-based analysis of ochre quarries and artifacts from associated archaeological sites has demonstrated continuity and change in the use of specific sources, preferential selection of some quarries over others, as well as variability in the extent and direction of ochre exchange networks.

MacDonald, Douglas (University of Montana), Matthew Nelson (University of Montana) and Jordan McIntyre (United States Army Corps of Engineers)

[140] *Archaeology and Geomorphology of Paleo-Shorelines at Yellowstone Lake, Wyoming*

Recent archaeological and geomorphological studies illuminate an understanding of paleo-shorelines along Yellowstone Lake, Wyoming. Current shorelines are not always adequate predictors of prehistoric archaeological site locations due to ever-shifting lake levels over the last 12,000 years. The 20-mile-long Yellowstone Lake is within a caldera and, thus, has experienced dramatic shifts in lake levels associated with volcanism. In addition, lake levels have changed greatly due to Late Pleistocene rebounding from isostatic depression and glacial melting. Until this year, archaeological survey along the eastern shore of the lake had failed to identify Paleoindian sites; however, recent surveys have identified Cody Complex cultural materials on Yellowstone Lake paleo-shorelines as much as 700 m interior from the current beach. In contrast, some paleo-shorelines in the southwestern portion of Yellowstone Lake are submerged under the current lake. This paper attempts to make sense of the information collected by geomorphologists and archaeologists to better understand and predict the locations of ancient sites around the various shorelines of Yellowstone Lake.

MacDonald, George (Bill Reid Foundation)**[176]** *The North Coast Prehistory Project of the National Museum of Canada*

The objective of the North Coast Prehistory Project was to investigate the development of Maritime adapted cultures in the Pacific Northwest and the role of exchange systems in the subsequent development of stratified societies including advanced systems of trade and warfare based on Northeast Asian prototypes. Excavations of the extensive shell middens of the Prince Rupert Harbor yielded evidence of elaborate militarism along with extensive inland trade. The project worked closely with the oral history experts of the Gitksan/Wetsuwet'in Peoples in defining the network of trails that linked the communities of the Nass and Skeena watersheds with the adjacent coast and testing their knowledge archaeologically. It was never a primary objective of the North Coast Prehistory Project to excavate human remains from the shell middens in the Prince Rupert Harbor. Nevertheless, it was necessary to remove several hundred skeletons that had been buried within the houses excavated. Studies conducted on the burial materials provided new knowledge on cultural practices, especially warfare, but also on nutrition, periodic resource failures, pathological features. The information on the population that DNA studies provided for the large sample of human burials from sites in the Prince Rupert Harbor continues to provide new insights.

Macdonald, Rebecca [50] see Diaz, Alejandra

MacDonald, Sarah (Bureau of Land Management) and Brian Yaquinto (Bureau of Land Management)**[367]** *Over the Mountains and through the Desert: Obsidian Use, Procurement, and Transportation in Northwest Colorado*

Obsidian is a rare raw material in northwest Colorado. As no naturally occurring sources have been identified in the region, obsidian artifacts recovered at archaeological sites were likely brought in through exchange or direct procurement during seasonal foraging routes. Using X-ray fluorescence (XRF) analysis to identify obsidian sources, this poster addresses three questions related to obsidian artifacts found in the Colorado Bureau of Land Management, White River Field Office (WRFO): what obsidian source materials were used by past inhabitants of the WRFO, how did obsidian sources change over time, and how were these materials transported into the region? XRF data suggest obsidian artifacts recovered from within the WRFO came entirely from sources outside of Colorado, and that a correlation between certain temporal periods and source may exist. To provide a more robust understanding of the XRF data, potential overland travel routes are predicted through the calculation of least cost paths in ArcGIS. Site data collected by the Colorado Bureau of Land Management, in addition to an examination of ethnohistorical accounts, are compared to the predicted routes to assess the accuracy of the paths.

MacDonald, Taylor (Dept. of Anthropology, Vanderbilt University), Natasha P. Vang (Dept. of Anthropology, Vanderbilt University) and Tiffany A. Tung (Dept. of Anthropology, Vanderbilt University)**[231]** *Documenting Dietary Effects of Imperial Collapse and Drought: Bioarchaeology and Stable Isotope Analysis at Huari-Vegachayoc Moqo, Peru*

This study examines the diets of 32 individuals who were deposited in the Vegachayoc Moqo sector at the site of Huari, the capital of the Wari Empire. The commingled skeletal remains date to the second half of the Late Intermediate Period (LIP), long after the empire's collapse circa 1100 CE. This was also a time of an extended drought. The diets, reconstructed from carbon and nitrogen stable isotopes from bone collagen, are compared among the individuals and to those of earlier Wari populations to investigate the sequential effects of Wari imperial collapse and a long-term drought. When the results of the LIP individuals are compared to previously published data of 21 Wari-era inhabitants from the nearby site of Conchopata, their diets are significantly different. The LIP mean $\delta^{13}C = -11.8\text{‰}$, showing that carbon enriched foods like maize were still consumed, but this is significantly lower than the preceding Wari era, suggesting that less quantities of maize were consumed. The LIP mean $\delta^{15}N = 13.0\text{‰}$, which is significantly higher than the preceding Wari era, a change that might reflect the increased aridity of the LIP, manuring of crops, and/or starvation.

MacEachern, Scott [161] see Wright, David

MacFarland, Kathryn (School of Anthropology, University of Arizona)**[221]** *Landscapes of Belief: Structured Religious Practice in Iron Age Central Eurasia*

Realistic, symbolic, and metaphorical representations of animals (i.e., Animal Style Art), and associated themes ("griffins"/animal fusion, combat, geometric design within animal) depicted on artifacts attributed to Scythian, Saka, and Xiongnu, from Iron Age (ca., 1000–100 BC) north-central Eurasia are the focus of statistical analyses identifying structured usage among the regions, linked to religious beliefs. Common expression of symbolic subject matter and themes on artifacts is analyzed with Integrated Distance Analysis (IDA), a GIS-based approach. Religion, for this purpose a structured system of beliefs and symbols that permeate everyday life, expressed through symbols and metaphor on material culture compounded with mobile lifestyles are a direct link to landscape utilization to identify and study the structure and expression of religious belief on a continental scale, or macroscale landscape, in north-central Eurasia. This paper demonstrates evidence that widespread display of distinctive and predominantly animal iconography on artifacts associated with the Scythian, Saka, and Xiongnu is a primary line of inquiry for identification of the way Iron Age peoples in central Eurasia interacted between groups throughout the region and structured their lives.

MacFarland, Douglas [343] see Hackenberger, Steven

Mackay, Alex (University of Wollongong), Sam Lin (University of Wollongong), Lachlan Kenna (University of Wollongong) and Alex Blackwood (La Trobe University)**[40]** *Silcretes from Nearby Sources Display Different Responses to Rapid Heating: Implications for Models of Early Human Heat Treatment*

Heat treatment of silcrete in the Middle Stone Age of southern Africa has been taken to indicate cognitive complexity. This inference is based on the argument that silcretes require well-regulated heating and cooling rates to avoid thermal fracture. Alternative arguments have been made that silcrete can be heat treated with limited control over temperature gradients, and thus that heat treatment may have been a relatively simple process. These apparently contrasting positions elide the fact that different silcretes may respond differently to heating. To test this proposition, we replicated a series of past experiments in which silcrete blocks of specific size were heated rapidly to high temperatures. We used silcretes from two nearby sources on the south coast of Australia, and three from sources around the Middle Stone Age site of Varsche Rivier 003 (South Africa). Our results demonstrate sufficient variability in heating tolerance between sources that both the simple and complex models of silcrete heat treatment can be supported, albeit in relation to rocks from different sources. The results imply that when silcretes from multiple sources were used—as at Varsche Rivier 003—optimal approaches to heat treatment may have required the application of more than one method.

Mackay, Alex [54] see Low, Marika

Mackie, Alexander (Hakai Institute), Nicole Smith (Hakai Institute), Colton Vogelaar (University of Victoria), Quentin Mackie (University of Victoria) and Joanne McSporran (Hakai Institute)

[49] *Coastal Settlement Patterns in British Columbia at the Pleistocene-Holocene Transition*

In this presentation we explore how early Holocene shoreline settlement patterns in Haida Gwaii can be used to inform the search for late Pleistocene sites on Quadra Island in the northern Salish Sea. The 11K to 14.5K cal BP shorelines on Quadra Island are located at elevations up to 180 m above modern. Low visibility necessitates focused investigations on these raised landforms in order to find early sites. We are applying our knowledge of the distribution of archaeological sites in Gwaii Haanas to Quadra Island. There are nearly 150 sites recorded in the intertidal zone of Gwaii Haanas, Haida Gwaii dating to 10,700 cal BP. Analysis of these data identified significant differences in settlement patterns between these early sites and those dating to the last two millennia. We also discuss whether early Holocene coastal settlement patterns may include a few long term residential sites from which people accessed many short term sites.

Mackie, Madeline (University of Wyoming), Todd Surovell (University of Wyoming), Robert Kelly (University of Wyoming) and Matthew O'Brien (California State University, Chico)

[332] *New Excavations at the La Prele Mammoth Site, Converse County, Wyoming*

The La Prele Mammoth site (formerly the Hinrichs or Fetterman Mammoth) was discovered and initially excavated in 1987 by a crew led by Dr. George Frison. The remains of a single juvenile Columbian mammoth (*Mammuthus columbi*) were recovered along with a stone tool, a possible hammerstone, and a dozen pieces of debitage. Due to landowner dispute, no further work was completed on site for 27 years. In 2014 we returned to investigate the potential for intact deposits and settle the debate about cultural use of the mammoth. The last three field seasons have resulted in clear evidence of human activity associated with the mammoth. The fortuitous discovery of a chopping tool 12 m south of the mammoth bone bed in 2014 resulted in the identification of a secondary work area, the "Chopper Block." This secondary location has produced multiple stone tools, hundreds of pieces of debitage, and artifacts never before seen in association with a mammoth in North America, including bone needles and an extensive ochre stain. The site offers the opportunity to better understand the activities which occurred at mammoth butchery sites during the Clovis time period.

Mackie, Quentin (University of Victoria), Colton Vogelaar (University of Victoria) and Daryl Fedje (Hakai Institute and University of Victoria)

[49] *New Approaches to the Underwater Archaeology of Hecate Strait, Haida Gwaii, British Columbia*

Archaeological investigation of the possible coastal route into the Americas has always been hindered by sea level changes, including the drowning of much of the Pleistocene coastal plain. While it is now understood that significant portions of the coastal plain were never drowned, it is also clear that some of the underwater terrestrial landscape is intact and has archaeological potential. New approaches to the survey and modeling of paleocoastlines may increase optimism of finding underwater coastal sites. In this paper we discuss underwater research on the seafloor of Hecate Strait, near Haida Gwaii, British Columbia. Swath bathymetry reveals intact landforms up to 145 m deep, confirmed by grab-samples of in situ plants and intertidal fauna. Local archaeological sites put people on the landscape by ca. 12,700 cal. BP, when sea levels were 100 m lower than modern, and bears and salmon are locally present by >14,000 cal BP. In this poster we discuss use of an Autonomous Underwater Vehicle to obtain high-resolution sidescan sonar of the seafloor. We also demonstrate some approaches in paleocoastal modeling which may help predict site location and recovery of archaeological materials from the deeply-drowned landscape.

[49] *Chair*

Mackie, Quentin [49] see Lausanne, Alexandra

MacLellan, Jessica (University of Arizona) and Daniela Triadan (University of Arizona)

[236] *Child Burials and Figurines at a Terminal Classic Maya Household, Ceibal, Guatemala*

The ancient Maya center of Ceibal is known for a florescence during the Terminal Classic period (c. AD 800–900), a time when most cities in the region were in decline. Excavations at the Karinel Group, a residential complex, have focused on the site's Preclassic origins. However, an elite household also occupied the area during the Terminal Classic period. The residents built four house platforms around a patio, had access to high-status goods, and took part in crafting activities. Along the centerline of the patio, they deposited a series of burials, mainly of children. These burials contained many grave goods, including ceramic figurines that functioned as ocarinas. Figurines have been found in two other child burials, and no adult burials, at the site. It has been observed elsewhere that Classic Maya figurines are frequently associated with women and children. These musical instruments shaped like human, animal, and supernatural characters may represent toys and educational tools, used for enacting intimate performances within the household. When compared to previously excavated burials at Ceibal, the Karinel Group burials demonstrate a flexible set of mortuary practices shared by elites during the Terminal Classic.

Macrae, Scott (University of Florida)

[214] *A Comparative Approach to Deciphering Past Agricultural Strategies in the Tropics: The Shared Trends of Resiliency, Vulnerability, and Complexity*

Tropical environments are defined by a shared suite of climatic and environmental variables. These unifying characteristics led past archaeologists to delineate these regions as incapable of fostering state level civilizations. These interpretations presumed a lack of resources required to support agricultural production at the level obligatory for the urban centers that define states. Modern studies in tropical ecology question this perspective by identifying a high degree of localized resource diversity. A comparative study of how tropical societies fashioned their agricultural strategies to manage climatic and environmental conditions, while exploiting local heterogeneous resources, reveals how past peoples were able to cope with their surroundings while supporting complex tropical states. This will be examined in case studies from classical era Southeast Asia (CE 800–1400) and Mesoamerica (CE 250–900), drawing evidence from excavations, historical documentation, and observations of living systems. Following the research objectives of the Socio-ecological Entanglement in Tropical Societies project, the presentation will address resilient and vulnerable qualities within the agricultural methods employed. Results demonstrate a shared trend toward increasing complexity within the agricultural strategies of these tropical societies as they managed their environmental circumstances and supported state level populations with increasing social hierarchies.

[214] *Chair*

MacWilliams, A. C. [303] see Roney, John

Madella, Marco (CaSEs—Universitat Pompeu Fabra)

[177] *The Archaeobotany of Plant Microfossils in South Asia: History and Perspectives*

The analysis of plant microfossils has progressed immensely in recent years. The increase in the number of phytoliths and starch grains works in several disciplines has substantially extended our knowledge about these microfossils, while at the same time diversifying the approaches by which they can be used as archaeological and paleoenvironmental proxies. This presentation will discuss the history and developments of plant microfossils in South Asia.

Madella, Marco [57] see Conesa, Francesc C.

Madrid González, Mariela Viridiana (Universidad Veracruzana)

[10] *Los campos de basalto de la Zona Costera de la Sierra de Santa Marta*

Los artefactos líticos han formado parte de la vida cotidiana de las sociedades humanas desde épocas muy remotas. Para las antiguas sociedades mesoamericanas, estos artefactos fueron habituales y sumamente importantes, principalmente utilizados para el procesamiento de alimentos y la trituration de minerales. El análisis detallado permitiría examinar, en términos funcionales, el sistema de organización de una sociedad y periodos cronológicos a los que pertenecen, al igual que, los espacios en los que fueron encontrados, nos aproximan a distintas situaciones de uso y estrategias funcionales dentro de contextos sociales, culturales y económicos. El hombre, para la manufactura de artefactos y herramientas líticas útiles a sus necesidades, empleó rocas y minerales. Las rocas son, fundamentalmente, conglomerados de diferentes minerales en su forma sólida, aunque algunas se componen de un solo mineral; se dividen principalmente en tres tipos: Sedimentarias, ígneas y metamórficas. Las características geomorfológicas de la Sierra de Santa Marta provocan la existencia de múltiples campos de basalto cuya explotación represento una actividad importante para el asentamiento.

Madril, Allen [343] see Marquardt, William

Madsen, Alan, Sean Dolan (Los Alamos National Laboratory) and LeAnn Purtzer (Los Alamos National Laboratory)

[366] *Stump Holes and Soot Staining: A 15-Year Update on the Wildfire Hazard Reduction Project at Los Alamos National Laboratory*

The frequency and severity of wildfires in northern New Mexico over the past several decades have increased, and wildfires often impact archaeological sites. In May of 2000, the Cerro Grande Fire burned approximately 48,000 acres of land in northern New Mexico including 7,650 acres within Los Alamos National Laboratory (LANL). Following the Cerro Grande Fire, wildfires continue to pose a threat to the Los Alamos community, LANL facilities, and cultural resources. In 2001, LANL implemented the Wildfire Hazard Reduction Project to reduce fuel loads (tree thinning) and to minimize impacts from future wildfires. A plan was implemented to survey burned and high risk areas, and mark all known and newly discovered archaeological sites for avoidance during tree thinning operations. Archaeologists surveyed approximately 7,800 acres and discovered 467 previously unidentified sites. Progress toward completion of site recording has been limited by budget, resources, and project load at LANL. As of 2015, 262 of the 467 cultural sites have been recorded. Sites consist of field houses, pueblos, cavates, rock art, trials, and artifact scatters ranging in dates from Early Archaic (5500 BC) to the Manhattan Project (1940s). This poster documents the work LANL archaeologists have completed so far.

Madsen, Christian K. (Greenland National Museum/National Museum of Denmark), Ian Simpson (University of Sterling), Michael Nielsen (University of Greenland) and Jette Arneborg (National Museum of Denmark)

[190] *On the Margins of the Marginal? Fringe Settlement and Land Use in Norse Greenland*

Just before AD 1000 pioneer Norse hunter-farmers settled in Greenland and established what would be the extreme western outpost of Scandinavia and Europe for the next 450 years. The unexplained disappearance of this marginal medieval colony around AD 1450 has always puzzled researchers and has been proposed as a prime example of maladaptation to climatic and environmental deterioration at the onset of the "Little Ice Age" (LIA). As part of the Island Ecodynamics in the North Atlantic Project (CIE), we have investigated Norse settlement and land use patterns in what has hitherto been considered the margins of the Norse Eysribyggð, South Greenland, in order to detect early signs of stress related to the LIA. Instead we have been able to outline the layout and dynamics of a complex and adaptive social-ecological system that challenge our very notion of settlement "marginality." It seems that some of the adaptive processes observed may indeed have worked to successfully counter early climatic deterioration. However, such initial and local adaptive successes could have masked underlying forces deeply rooted in established patterns of social organization and hierarchy that were undermining the long-term resilience of the medieval Norse society as a whole.

Madsen, Christian K. [32] see Dugmore, Andrew

Magalhães, Marcos (Museu Paraense Emílio Goeldi)

[62] *A Cultura Tropical e a Origem da Antropização da Amazônia*

Arqueólogos estão revelando que além de terem domesticado algumas plantas para consumo, como a mandioca, por exemplo, os indígenas teriam agido de modo a cultivar florestas inteiras! Além disso, pesquisadores de diferentes áreas do conhecimento estão confirmando que a formação de parte das florestas e biodiversidade amazônicas, é produto da seleção cultural de espécies. A consequência disto foi que, muito provavelmente, boa parte das florestas conhecidas como naturais seriam, na verdade, obra do engenho humano. Isto é, de origem antrópica. Em cavernas localizadas no topo da serra de Carajás existem evidências de que populações caçadoras-coletores, que teriam chegado na Amazônia no início do Holoceno há mais de 11,000 anos, já exerciam impactos significativos sobre o ambiente. Em termos gerais, muito provavelmente, essas populações viviam da caça, da coleta, da pesca, do manejo e, posteriormente, também do cultivo de pequenas roças. O conjunto dessas ações vai constituir um processo civilizador de longa duração conhecido como Cultura Tropical. Foi durante a Cultura Tropical, portanto, muito antes das populações sedentárias horticultoras, que foi iniciado o manejo, a domesticação de plantas e, inclusive, a produção artesanal de cerâmica.

Magaloni, Diana [392] see O'Neil, Megan E.

Magee, Shelby (University of New Mexico)

[346] *From Roads to Ritual: Comparing Logics and Scale of GIS Analyses of Inka Imperial Landscapes*

During their expansion throughout the Andes, the Inka Empire restructured a cultural and physical landscape to meet objectives of logistical and ideological control over their subjects. While this process is embodied by archaeological features such as large-scale infrastructure and the strategic positioning of sacred places, interpreting these datasets require appropriately scaled analyses for which GIS is uniquely suited. In this paper, I explore this topic by comparing two geospatial analyses, each evaluating a different aspect of Inka imperialism. I first use a Least Cost Path Analysis (LCPA) performed on a segment of the Chinchaysuyu Inka road from Cuzco to Vilcashuaman in central Peru to inform how the Inka used roads as a means of imperial control on a regional scale. The second case study addresses ritual activity on a more localized scale with a Visibility Analysis (VA) from the

mixed Inka/local administrative center of Turi in northern Chile. This analysis scrutinizes the location of the surrounding non-Inkan sites' ritual contexts to discuss where indigenous rituals were continued after the incorporation of the settlement into the Inka Empire and whether or not these ritual activities were performed out of sight of imperial authorities.

Magnani, Matthew (Harvard University)

[138] *Indigenous Experimental Archaeology: A Community-Driven Remembering of Technique*

Archaeologists rely heavily on experimentation to understand the past. Today, we are not the only ones. Indigenous peoples and members of the public are consulting ethnographic and archaeological museum collections, by trial and error investigating techniques of object production. Many of these individuals work with craft specialists, and others are craftspeople themselves. They seek to learn, remember, and reclaim lost or fading skills in an attempt to connect with their pasts. The process bears striking similarities to academic experimental archaeology, yet often occurs in an inclusive environment, open to community feedback. Here I review the process as it is being undertaken among the Sámi in arctic Finland and Norway, and demonstrate the mutual benefits of pursuing a collaborative experimental process.

[138] *Chair*

Magnani, Natalia (Cambridge University)

[138] *Repositioning Habitus as Cultural Capital in Sami Museum Collections*

Ethnographic museum collections are frequently presented as regional culture histories, portraying a timeless native past. In the Sámi regions of Finland, institutionalized courses and individuals seek to manufacture of museum objects anew, and exhibit this present revival in concert with the past. The re-created objects are not only shown in their present living contexts but removed from museums and used at local cultural events. These new forms of representation emphasize living use and community memory as a form of cultural capital. Exploring the intersection of Bourdieu's concepts of cultural capital and habitus, I examine museum spaces and objects in indigenous communities and how they are shifting to reflect new values. In these cases, an emphasis on community memory, local experiences and participation transforms the ways of thinking needed to engage with exhibits and their contents.

Magnoni, Aline (American Association for Advancement of Sciences), Travis Stanton (University of California, Riverside), Vania Carrillo Bosch (Dirección de Registro Público de Monumentos y Zon), Cesar Torres Ochoa (Universidad de las Americas Puebla) and Tanya Cariño Anaya (Sip UvA Universiteit van Amsterdam)

[329] *In the Realm of Lady Six Sky: The Place of Ikil in the Late-Terminal Classic Itza Landscape*

Due to the proximity, contemporaneity, and some architectural and ceramic similarities with Chichén Itzá and Yaxuna, Ikil provides an important opportunity to understand the political and socioeconomic integration present in the Late-Terminal Classic in the region southwest of Chichén Itzá, as the seat of regional power was transferred from Yaxuná to Chichén Itzá. The Proyecto de Interacción Política del Centro de Yucatán (PIPCY) has been investigating the site of Ikil since 2008. Ikil was located sufficiently close (16 and 26 km, respectively) to have been under the direct influence of Yaxuna first and Chichén Itzá later. The main structure at Ikil, an imposing 23 m radial pyramid, suggests that Ikil may have been an independent regional capital. Yet, Ikil's radial pyramid bears a strong resemblance to the Castillo at Chichén Itzá indicating instead that Ikil may have been an Itzá administrative center. Stylistic and ceramic ties to Yaxuná suggest clear connection to this earlier regional capital. Unfortunately, Ikil's twenty glyphs (on the lintels of the main pyramid) do not shed light on the regional ties to other sites. Here we attempt to unravel the different lines of evidence to understand the place of Ikil in the Late-Terminal Classic landscape.

Magnoni, Aline [328] see Carrillo Bosch, Vania

Magoon, Dane (Defense POW/MIA Accounting Agency)

[41] *Finding the Right Spot: Utilizing Historic Maps, Period Imagery, and Archaeological Data to Identify Aircraft Crash Sites within the Larger Battlefield Landscape*

Identifying aircraft crash sites is a critical component of the mission of the Defense POW/MIA Accounting Agency. This paper uses several examples of aircraft crash incidents and illustrates the contextual use of multiple lines of data, such as historic imagery, GPS, period maps, and GIS for the effective location of individual crash sites across the greater battlefield landscape. This effort is undertaken to help address the goals associated with DPAA's greater mission: the return of missing U.S. service members associated with past conflicts.

Mahar, Ginessa (University of Florida)

[380] *Investigating the Impact of Fish Weirs from the Bottom Up: A Perspective from the Southeast (USA)*

Archaeological approaches to fish weirs in the southeastern United States have traditionally focused around issues of social complexity and resource intensification in the Mississippian period (post-cal AD 1000). This pairing has limited our view of the antiquity of fish weirs and their sociocultural impact beyond economics, subsistence, and politics—the assumption being that weirs were an answer to a problem of economic demand from the top down. However, a recent look into regional archaeological site files suggests that some southeastern fish weirs predate the complex societies of Florida (e.g., Calusa) and Georgia (e.g., Guale) by over 1,000 years. Thus, fish weirs were being constructed by small-scale communities with different sociopolitical and subsistence needs than their future counterparts. This paper takes a closer look into the evidence and antiquity of fish weir use in the southeast, focusing on small-scale communities and the impact that fish weirs had from the bottom up. To do this Ingold's Taskscape will be invoked as a framework for several lines of evidence, including: ethnohistoric, ethnographic, archaeological, and experimental. It will be shown that the onset of fish weir use in the southeast deeply affected daily practices while broad and varied transitions took place contemporaneously.

[380] *Chair*

Maher, Lisa (University of California Berkeley)

[110] *Discussant*

Maher, Lisa [95] see Ramsey, Monica

Maher, Ruth (William Paterson University), Robert Friel (Bradford University), Lindsey Kemp (Oxford East), Julie Bond (Bradford University) and Stephen Dockrill (Bradford University)

[224] *The Potential for Georeferenced Spatial Data on Coastal Erosion Sites*

Coastal erosion sites contain the same complexity as any other site; however, the sequences are often truncated and the recovery conditions require adaptive approaches. Although these sites are eroding, there is a need for equal rigor in their recording. The coastal erosion site at Swandro, Rousay, Orkney, has been recorded using a variety of georeferenced datasets. This paper examines the potential of microanalysis of the 3D coordinate records of artifacts and georeferenced photogrammetry from a single building. The complex deposition sequence, together with the spatial distribution of artifacts within a Late Iron Age Structure, are explored using GIS. The deposits within the building indicate slag and other artifacts associated with metallurgy. The analytical potential for an integrated management using GIS is explored here. The potential that coastal erosion sites have for the understanding of formation and cultural interpretation at a micro-level is highlighted in this paper.

Mahoney, Maureen (Seminole Tribe of Florida THPO)

[365] *Dating a Tree Island: A Comparison between Faunal Bone, Shell, Pottery, and Coprolites*

South Florida's tree island hammocks are islands that were once completely surrounded by water and used as habitation areas from the Archaic period and beyond. Although many islands along the coast can be dated using marine shell, interior tree islands (such as those found on Seminole Tribe of Florida reservation lands) generally lack these artifacts making for a difficult dating strategy. This paper will focus on a comparison of dating material, including shell, pottery, faunal bone, and coprolites to determine the accuracy of results from each sample type. This analysis will prove important in determining the overall age of tree island archaeological sites located in South Florida, and provide unique insight into tree island formation processes.

[108] *Discussant*

Mahoney, Nancy (Montana State University)

[360] *Ethics and Artifact Collecting: Interviews with Montana Collectors*

Why do people collect artifacts? This paper summarizes the results of twenty interviews with artifact collectors and tribal members regarding the nonprofessional collection of artifacts of American Indian heritage in Montana. The results of this research are relevant to the current debates regarding the ethical considerations surrounding collaborations among professional archaeologists and artifact collectors. In particular, this research highlights divergent perspectives regarding the meaning and value of artifacts to various stakeholder groups (i.e., professional and academic archaeologists, rural landowners, descendant communities, collectors, avocationalists, museums, regional historical societies, and federal and state agencies).

Maier, Andreas [165] see Bradtmöller, Marcel

Maillot, Marc (SFDAS/UCF)

[219] *The Palace of Muweis and Its Medieval Necropolis*

Muweis is located in the Shendi reach, about 300 km north from the capital of Sudan, Khartoum. Its palace has been excavated by the Louvre Museum since 2007. It is part of the Meroitic Kingdom (350 BCE–350 CE), which covered an area of 1,500 km on the Middle Nile Valley, making it the most important political structure known in Sub-Saharan Africa until the nineteenth century. In 2008 a medieval necropolis was discovered among the remains of the palace, under the debris of a small house situated at the top of the mound sheltering the monumental building. Twenty-one graves were identified dating to the thirteenth century CE. The palace ruins give insight into the hierarchy (i.e., position) of the graves within the necropolis. Indeed, according to social status, the graves were dug in particular spots of the palace ruin. For example, grave F15, corresponding to the burial of the community leader, was placed at the very heart of the palace and covered by wooden beams, the only architectural feature recognizable in the necropolis. This presentation is dedicated to the archaeology and site description of this necropolis.

Maillot, Marc [219] see Ardagna, Yann

Mainfort, Jr., Robert C. [341] see Richards, John

Mainland, Ingrid [124] see Downes, Jane

Makarewicz, Cheryl [275] see Eguez, Natalia

Makarewicz, Cheryl (Christian Albrechts University, Kiel)

[284] *Stable Isotopic ($\delta^{13}\text{C}$ and $\delta^{18}\text{O}$) and Zooarchaeological Insights into Vertical Transhumance of Early Neolithic Domesticated Sheep and Goats in Southern Jordan*

Vertical transhumance provides livestock with consistent access to quality graze throughout the year and likely contributed to the intensification of livestock husbandry in the Near East over 10,000 years ago. Here, carbon ($\delta^{13}\text{C}$) and oxygen ($\delta^{18}\text{O}$) isotopic time series obtained from sequentially sampled domesticated and wild herbivore teeth recovered from late Pre-Pottery Neolithic B (ninth millennium cal BP) settlements, each located in the sharply divergent elevations of southern Jordan, were measured. Inverse cyclical variation visible in the carbon and oxygen isotopes of sequentially sampled sheep and goat teeth, and further calibration of sheep and goat $\delta^{18}\text{O}$ values against those from aurochs and gazelle, which track the oxygen isotopic composition of meteoric water and leaf water, respectively, reveal use of complex livestock husbandry systems that included vertical transhumance, stationary flock-keeping, and winter foddering. These isotopic data are then used to further inform zooarchaeological datasets from late PPNB settlements located in the Jordanian highlands and steppic margins.

Makowski, Krzysztof

[316] *Religion and Power in the Middle Horizon: Castillo de Huarmey Imagery and Styles*

The idea that diffusion of a proselytizing religion is one of the main factors that generated the horizon effect follows the research on Wari and Tiwanaku phenomena since its inception. The seminal works of Dorothy Menzel have also convinced generations of scholars about the alleged relationship of these phenomena with the Wari Empire ideology and on the particular role that the sanctuary of Pachacamac fulfilled in this process. The analysis of rich ceramic and textiles from Castillo de Huarmey, the necropolis of high Wari elite and administrative center on the northern coast of Peru, built in the second half of the Middle Horizon (AD 800?–1000), contrary to expectations, does not offer any arguments to support this hypothesis. Despite the large number of fragments and whole pieces relating to probable local imitations of southern styles from the Wari nuclear area, the presence of characters and details typical for the iconography of Conchopata and Wari—the staff gods and winged characters—is rare in the elite funerary grave goods, with the

exception for some textile and wooden objects, that were possibly imported. Very similar situation can be observed in Pachacamac funerary contexts and in post-Lima culture offerings.

Makowski, Krzysztof [170] see Pimentel Nita, Roberto

Maksudov, Farhod [29] see Frachetti, Michael

Malainey, Mary (Brandon University) and Timothy Figol (Brandon University)

[21] *But Did They Eat Their Greens? Evidence of Plants in the Pottery of Northern Plains Bison Hunters and their Neighbors*

Accounts of the amount of meat consumed by First Nations who relied on bison are spectacular; but, there are also reports of plant collection and use. The challenges and successes of using lipid residue analysis to detect plants in precontact Indigenous pottery are outlined. Fatty acid compositions of fresh roots, greens and certain berries form several distinct clusters when subjected to statistical analyses. Degradation processes arising from cooking and the passage of time tend to remove these differences. The presence of these low fat content plant products is typically indicated by residues with elevated levels of medium chain saturated fatty acids. The occurrence of plant sterols and characteristic distributions of triacylglycerols can provide additional support for these identifications. Lipid residue analysis shows that certain pots recovered from sites in the Northern Plains, adjacent parkland and southern boreal forest were reserved exclusively for plant materials. When combined with functional analyses, it is clear that certain Late Precontact Period vessel forms were more likely to contain only plant products. Lipid residues extracted from other vessels indicate plants were also prepared in combination with animal products.

Malcuit, Dee (Clark State Community College)

[19] *Incorporating Sex/Gender and Sexuality Studies into General Education Curriculum*

When considering how to incorporate sex/gender and sexuality studies into college curricula, the question is: Where to start? In this paper, I argue that college and university programs should include content on the social construction of sex/gender and sexuality within general education courses. I will predominately focus on my work with Ohio community college students as a case study that has broader implications for general education outcomes. Pairing courses such as Sociology and Archaeology (as well as other social sciences) provides opportunities for the creation of learning communities to address social topics such as sex/gender and sexuality from diverse perspectives. Teaching across the curriculum enables an open dialogue to critically review the many causes of, and potential solutions for, inequality. Further, academic collaboration functions to create greater social awareness and understanding through the analytic process of intersectionality.

Maldonado, Blanca (El Colegio de Michoacán, A.C.)

[164] *Primary Copper Smelting in Mesoamerica: A Case Study from Central Michoacán*

Copper was the main metal produced and worked in Mesoamerica, but data for premodern primary production and processing remain elusive. Systematic research at Itziparátzico, a Late Postclassic location in Central Michoacán, Mexico, has located evidence of copper production areas where concentrations of smelting slag were recorded. The absence of metallurgical materials other than slag (e.g., crucible fragments, mold fragments, stock metal, metal prills, failed castings, part-manufactured objects and spillages, etc.) around Itziparátzico indicate that only primary copper production had been carried out at the site. The analyses of slag samples corroborate that the production activities carried out at Itziparátzico involved primary smelting, and revealed a sophisticated smelting method, possibly involving the use of furnaces properly designed and built to provide reducing conditions during the refinement of copper ores. Recent archaeomagnetic dating of slags recovered from the area substantiate the Prehispanic origin of this technology.

[164] *Chair*

Maldonado, Blanca [135] see Espinosa-Pesqueira, Manuel

Maldonado, Ronald (Westland Resources)

[394] *Long Day's Journey into Night: Government to Government Consultation under Section 106 on the Navajo Nation*

Section 106 of the National Historic Preservation Act of 1966, as amended requires that the Federal Agencies consult with American Indian Tribes on a government to government basis. There are numerous guidelines and trainings on how this should be accomplished under the law, but these do not consider the Tribal point of view. American Indian Tribes are sovereign Nations and expect to be treated as such, expecting long term relationships with Federal Agencies. During my tenure with the Navajo Nation, it was my job to build those relationships, by educating the Agencies and project proponents as to why the cultural resources were important to the Navajo People. These cultural resources were both on and off the Navajo Nation lands, so consultation could also include 22 other tribes who claim aboriginal use of Navajo Reservation lands and other Federal Lands. How these resources were managed was dependent on the relationships that had been built over the years.

Malfatti, Gina (College of Wooster) and Paul Nick Kardulias (College of Wooster)

[90] *Viking Age Grave Reentry within the Context of Mortuary Drama*

The present study traces the history of grave manipulation and reentry in Scandinavia from the Stone Age through medieval times, but with a special emphasis on the context and implications of funerary activity during the Viking Age and the early medieval period. During this time span, the people of Scandinavia became a major force that reshaped the economic, political, and social structure of Europe. I examine the phenomenon of grave reentry and alteration within the framework of Neil Price's (2010) idea of Viking Age "mortuary drama." This study extends the idea of mortuary drama to the acts of reentry that may occur even centuries after the initial funerary performance. Particular emphasis is placed on boat and ship burials because they reflect the wealth and power of emerging elites. This study will discuss several sites including the Gokstad and Oseberg ship burials and the Valsgård cemetery. The themes of space, monumentality, memory, and ritual all play a part in the theoretical perspective that the present study employs.

Malhi, Ripan (University of Illinois Urbana-Champaign)

[176] *Eight Years of Partnership with Coast Tsimshian First Nations on Genomic Research*

In 2008 a partnership was established with the Coast Tsimshian to use genomics as a novel avenue of research to learn about the population and evolutionary history of these First Nations. Community based research methods were used as a way to establish research goals that were respectful and mutually beneficial to all parties. Through this partnership we have been able to gain insight into the present-day and ancestral Coast Tsimshian genetic structure. Specifically, we have demonstrated a close genetic affinity between present-day members of the Coast Tsimshian community and ancestors through paleogenomics analysis of human skeletal remains from the Prince Rupert Harbour region. We have also showed how ancient peoples of that

region adapted to their environments prior to European contact. We estimate the decrease in effective population size as a result of the well-known population decline due, in part, to the introduction of novel pathogens.

[176] Chair

Malhi, Ripan [176] see Bader, Alyssa

Malkinson, Dan (University of Haifa), Daniel Kaufman (University of Haifa) and Dani Nadel (University of Haifa)

[332] *Knapping Flint on a Brush Hut Floor: An Example from Ohalo II, a 23,000-Year-Old Camp in Israel*

Thousands of open-air campsites dating to the terminal Pleistocene and early Holocene have been recorded around the world. However, most suffer from significant preservation issues which limit available data on two levels: the general camp structure, and the details of each feature. The excellent preservation of the submerged site of Ohalo II (23,000 cal BP) provides an opportunity to analyze such a site on both levels. The focus of the paper is a flint assemblage (n = 5,621) from a fully-excavated brush hut floor serving as a case study for characterization and analysis of flint knapping activity. The assemblage was fully studied for all its components and the results were mapped and statistically analyzed for correlations between components. Furthermore, 62 flint specimens were refitted (including cores, debitage and tools). Two in situ and spatially distinct knapping/activity areas were identified, one of which was devoted to manufacture and/or retooling and/or storage of microliths. Similar remains show that the same activities took place in other brush huts. Each floor was also rich with butchered animal bones, fish remains, and edible cereal grains. We conclude that each brush-hut appears to represent a household unit that included "indoors" tool preparation, maintenance, and maybe even discard.

Mallard, Angela [287] see Auerbach, Benjamin

Mallick, Swapan [92] see Kim, Alexander

Mallol, Carolina [275] see Eguez, Natalia

Malloy, Kevin (University of Wyoming) and Heather Rockwell (University of Wyoming)

[186] *Just a Scratch: An Experimental Application of Reverse-Microwear Analysis*

In the summer of 2013 a thin piece of slate with peculiar, jagged grooves was recovered from the excavation of the Buzzart Dykes medieval park landscape in the council area of Perth and Kinross, Scotland. Unclear whether the grooves were natural or anthropogenic we employed a new method of examination, known as "reverse microwear analysis," to understand what material made the scratches. A series of experiments were conducted where slate pieces were incised using a variety of different stone and metal artifacts. Using high resolution microwear images taken with a Nikon SMZ 800 stereoscopic microscope with a range of 20x–120x magnification, we compared our control group to the incisions present on the artifacts to try and determine the most likely method used to create these marks. The result was a new methodology for understanding the slate artifact as contemporary with the medieval park or an artifact of the pre-medieval landscape disturbed during the park's construction phase. Furthermore, this methodology has applications for understanding artifact creation when there is discrepancy surrounding age, tool utilization, and artifact processing.

[186] Chair

Malo, Erika [97] see Schields, Rebekah

Malone, Caroline (Queen's University Belfast), Nicholas Vella (University of Malta), Reuben Grima (University of Malta), Katya Stroud (Heritage Malta) and Anthony Pace (Superintendence of Cultural Heritage Malta)

[133] *Introduction—Islands Connected or Unconnected: A Case Study of Malta*

Islands gave birth to many cultural and economic adaptations in prehistory. After an introduction to the symposium, the paper will focus on the small archipelago of Malta, which demonstrates a particularly resilient trajectory of survival set against environmental and economic limitations that lasted millennia. Compared with the neighboring areas (Sicily, Sardinia, Italy) Maltese megalithic "Temple" culture presented an unparalleled c.1,500 years of unbroken development, and this paper discusses the factors that enabled a very small community to develop coping strategies more typical of advanced civilization than of Neolithic society. Recent intensive fieldwork of the FRAGSUS project (funded by the European Research Council) has revisited sites last examined a century ago, to sample chronological and paleo-economic data to reassess the apparent longevity of early Maltese cultures. The discussion will explore whether present data can demonstrate if these early peoples were as connected to each other through shared identities and exchange of material goods as we might expect in the relatively restricted space of the Mediterranean, or whether the emergence of disconnectedness is the outcome of close proximity and broadly similar shared origins.

[133] Chair

Maloney, Jillian [180] see Gusick, Amy

Malovoz, Andreja (Institute of Prehistory, Protohistory and Near-Eastern Archaeology, Heidelberg)

[168] *Changing Social Spatiality in Mounded Funerary Landscapes*

Funerary landscapes, as places where all fractions of society meet to honor the rituals of social and identity-building importance, can be used to attain an insight into group-specific attitudes toward spatiality. These attitudes allowed for people's engagement with various elements of their environment as a means of deliberate creation of lasting ritual landscapes. However, social spatiality in funerary contexts is not static, but subject to changes in the group's perception of both their landscape and their dead. Fifteen recently discovered tumulus sites in the region of Županjaska Posavina in Eastern Croatia represent a unique ritual landscape and offer evidence for these changes which took place at the transition from the Middle to the Late Bronze Age. Ongoing excavations at one of these sites, Purić-Ljubanj, have shown that, while maintaining the most visible elements of the ritual during this period, the people have changed the inner architecture of the mounds and stopped the spreading of the cemetery by inserting the new mounds between the already existing ones. The results from these excavations may serve to determine how the reinterpretation of the ritual and the existing landscape may give rise to new forms of expression of local identity in prehistory.

Mamani, Jesus [75] see Mamani, Manuel

Mamani, Manuel (Universidad Nacional de San Agustín) and Jesus Mamani**[75]** *Continuidad y cambio: Un estudio comparativo e interpretativo de los espacios domésticos de Mawchu Llacta*

Una de las más grandes reformas llevadas a cabo durante el Virreinato en el Perú fue la Reducción General de Indios, que consistió en el traslado y reubicación de las poblaciones indígenas. Este proceso de cambios no solo se enfocó en la generación de una nueva forma de asentamientos humanos, sino que también afectaron con toda una estructura social, que a su vez repercutió en el modo de vida y bagaje cultural materializado en la distribución, uso y representación de espacios, es este el caso de los espacios domésticos, los cuales formaban parte de la identidad cultural de la población trasladada. El presente artículo abordará el tema de como se ha venido desarrollando la incorporación e integración cultural dentro de estos espacios domésticos en los diversos traslados, respondiendo a la interrogante, que si estos contextos aún mantenían el mismo valor representativo antes y durante su traslado. A través de un estudio comparativo entre la evidencia arqueológica y las fuentes orales obtenidas durante la temporada 2016 del proyecto PATA en la reducción de Santa Cruz de Tute, Provincia de Caylloma, Arequipa. Nos permitirá identificar elementos recurrentes y variables dentro de estos espacios domésticos para su posterior contrastación con las fuentes orales.

Mamani, Manuel [75] see Juengst, Sara L.

Man, Xingyu Man [115] see Han, Tao

Mancini, María Virginia [62] see Franco, Nora V.

Mandel, Rolfe (Kansas Geological Survey)**[307]** *Geoarchaeology of the Coffey Site, Northeastern Kansas: Implications for Finding the Material Remains of Paleoamericans in the Eastern Plains, USA*

The Coffey site in the Big Blue River valley of northeastern Kansas is best known for its stratified Middle Archaic components. However, recent investigations at the site recorded stratified Late and Middle Paleoindian cultural deposits and what may be an Early Paleoindian or Pre-Clovis component in the late member of the Severance Formation, a Wisconsinan-age lithostratigraphic unit that occurs as a remnant beneath the T-1 terrace of the Blue River. The late member of the Severance Formation appears to span Marine Isotope Stage 2 and records valley activity just prior to and during cool and dry conditions that coincide with the accumulation of Peoria Loess and related eolian sand on the T-2 terrace and upland landscapes. This paper addresses the stratigraphic context of the Paleoindian components in the Severance Formation at the Coffey site and considers the potential for pre-Clovis cultural deposits in the Severance at Coffey and elsewhere in the Eastern Plains of the United States.

[253] *Discussant***Manin, Aurelie (UMR 7209—MNHN—Paris [France]), Antoine Dorison (UMR 8096—ArchAm [France]), Marion Forest (UMR 8096—ArchAm [France]) and Grégory Pereira (UMR 8096—ArchAm [France])****[340]** *Between Farming and Hunting: Animal Exploitation in the Zacapu Basin, Michoacán, Mexico (AD 100–1450)*

If the questions of herding or management of wild species have been regularly addressed in Mesoamerican zooarchaeology, cultural development is assumed to be essentially directed by agriculture. Indeed, the presence of only two widely recognized domesticated animals, the dog (*Canis familiaris*) and the turkey (*Meleagris gallopavo*), would have limited the growth of a more complex agropastoralism. However, the importance of nondomesticated animals and their interactions with the agricultural sphere may be underestimated. As demonstrated by ethnographic data, traditional Mesoamerican populations would obtain not only crops from cultivated fields, but small animals as well through a practice of so called garden-hunting. Based on the zooarchaeological study of three sites from the Zacapu Basin (Michoacán, Mexico), ranging from AD 500 to 1450, this presentation will explore the relationships between animal exploitation and cultural construction. We will show how exploitation practices evolve, following an increasing demographic pressure in the region, from an opportunistic hunting behavior to the development of garden-hunting and what seems to be the late adoption of the turkey as a new domesticated animal.

Mann, Allison E., Kirsten Ziesemer (Faculty of Archaeology, Leiden University, Leiden), Krithivasan Sankaranarayanan (Department of Microbiology and Plant Biology, Univ), Corinne L. Hofman (Faculty of Archaeology, Leiden University, Leiden,) and Christina Warinner (Department of Anthropology, University of Oklahoma)**[86]** *DNA Preservation in Archaeological Dental Calculus and Dentine*

Ancient DNA provides unique insights into past human behavior, health, and evolution. Skeletal tissues (bone and dentine) and microbiome remains (dental calculus and paleofeces) can be rich sources of ancient biomolecules; however, inconsistent DNA preservation and variable environmental contamination pose major challenges in recovering authentic ancient DNA. Recent studies have suggested that dental calculus may provide a better preservation environment for ancient DNA than other skeletal tissues, but this hypothesis has not yet been systematically tested. In this study, we analyze the preservation of microbial and human DNA in 12 paired dental calculus and dentine samples from 6 archaeological sites (spanning 2950 BCE to 1900 CE) using a high-throughput metagenomics approach. We find that endogenous microbial DNA is typically more abundant and better preserved in dental calculus than in dentine, and we report differences in DNA preservation between oral-associated bacteria and archaea. By contrast, human DNA is typically more abundant and longer in length in dentine than in dental calculus, but there is also a higher rate of cytosine deamination damage in dentine, suggesting greater vulnerability to single-stranded DNA generative processes.

Mann, Allison E. [69] see Ziesemer, Kirsten

Manne, Tiina (University of Queensland), Peter Veth (University of Western Australia), Fiona Hook (University of Western Australia), Kane Ditchfield (University of Western Australia) and Ingrid Ward (University of Australia)**[302]** *Understanding Pleistocene and Early Holocene Faunal Exploitation at Barrow Island, Northwest Australia*

Barrow Island, located 50 km off the modern Pilbara coast, contains the longest and richest archaeological record of Pleistocene coastal settlement in northern Australia. During lowered sea levels of the Pleistocene, the island was part of the greater Australian continent. Archaeological survey has revealed an array of sites in cave, rockshelter, and open-air settings. The most diverse record has been recovered from a large limestone cave, where repeated visits began at c. 50 ka BP and continued until 7.5 ka BP, when increasing sea levels isolated the island from the mainland. Archaeofaunal records demonstrate that throughout this time, people visiting Boodie Cave exploited a combination of marine and terrestrial resources. Although medium and large-sized macropods are staple foods throughout occupation, various marine resources are found from the oldest deposits onward.

During much of the Pleistocene, prey consisted of medium-large terrestrial game and marine gastropods, but as the coastline neared the site, an increasingly diverse range of resources was consumed. This culminated in the early Holocene, when prey included over 25 species of vertebrates and 40 species of shellfish. These patterns likely reflect the changing role of the cave within the cultural landscape, rather than any dramatic shifts in resource exploitation strategies.

Manning, Sturt

[81] *Prospects and Challenges for High-Resolution 14C Chronologies: New World and Old World Investigations*

This paper will present some current work in 1) NE North America (northern Iroquoia), 2) NW Mexico, and 3) the East Mediterranean-Caucasus using radiocarbon (14C) dates integrated with archaeological/historical and/or dendrochronological information to try to achieve high-resolution chronologies via Bayesian chronological modeling. The paper will discuss and investigate the potential to achieve much greater precision which, through defining new chronologies, can in turn be transformative for archaeological and historical analysis. But the paper will also consider some of the problems or limitations in such work, and will review the conditions necessary to achieve robust, precise, and accurate chronologies for the past via radiocarbon and Bayesian chronological modeling.

Manning, Sturt [257] see Urban, Thomas

Mans, Jimmy [384] see Siegel, Peter E.

Mansrud, Anja (Museum of Cultural History, University of Oslo)

[35] *Liminal Agents: Exploring the Social, Ritual, and Cosmological Aspects of Fishhook Manufacture in Middle Mesolithic Coastal Communities (8300–6300 BC)*

This contribution aims to investigate the entanglement of environment, materiality, technology and cosmology in the Middle Mesolithic Stone-Age (8300–6300 cal. BC), of the North East Skagerrak area, Eastern Norway and Western Sweden, by focusing on the manufacture of bone-fishhooks. I argue that fishhooks are keys objects for exploring the worldviews of Middle Mesolithic coastal groups. Fishhooks were linked with daily subsistence, invested with much labor, and their manufacture entwined with the hunting of ungulates that provided the raw material. The process of producing fishhooks involved the transformation of living bodies into artifacts. Thus, I argue that these mundane objects were considered active agents in mediating the dangers and insecurities of an unpredictable “life aquatic.”

Manzanilla, Linda R. (U Nacional Autonoma de Mexico)

[217] *Xalla, Teotihuacán: A Multifunctional Palace for the Ruling Elite of Teotihuacán*

In corporate societies such as Teotihuacán, it is not easy to detect the places where the ruling elite dwelt, made decisions, managed goods and labor, or participated in cult activities. Teotihuacán is very different from the Maya urban sites: no royal tomb has been found, rulers are not depicted or easily recognized. The corporate organization may have permeated the ruling elite, where a possible council of lords may have headed the Teotihuacán state. Xalla, with a surface of ca. 50,000 m², is located 235 m to the north of the Pyramid of the Sun. Since 1997, it has been under research by Linda R. Manzanilla; 15% of it has been extensively excavated. It may have been one of the seats of power for ancient Teotihuacán. The main plaza consists of four equivalent elevated precincts, one to each cardinal point, and set around a temple in the center. These four precincts had iconographical elements related to different deities, suggesting that the possible co-rulers may have been related to particular gods. The ruling elite of Xalla had embedded craftsmen located in Plaza 5: lapidary craftsmen, painters, garment-makers, carpenters, and perhaps also potters. Xalla has also a royal treasure of mica.

[217] *Chair*

Manzanilla, Linda R. [274] see Barba, Luis

Manzetti, Cristina [29] see Parkinson, William

Mao, Ruin [117] see Wang, Hua

Mara, Anisa

[261] *Prehistoric Pottery Production and Distribution in the Shkodër Region of Northern Albania*

The aim of my poster is to present new provenience data regarding pottery sherds from several prehistoric archaeological sites in Shkodër, Albania. The pottery samples to be analyzed are from survey and excavation and were collected by the Shkodra Archaeological Project (PASH). Pots appear to have played important social and economic roles in Shkodër, but we do not yet know where they were made. Previous studies based on stylistic analysis refer to the large hill fort site of Gajtan as a center for pottery production during prehistory. My research tests this assumption using methods of petrographic analysis. Petrography points to multiple production centers and some limited ceramic exchange.

Marajh, Leah (University of Toronto)

[214] *The Socio-Ecological Entanglement of Water and Resilience in Past and Present Tropical Societies*

Urban resilience and sustainability have gained increasing prominence in the literature as concerns regarding water resources and climate change continue to grow. Cities, particularly those in the midst of extreme urban development, are facing a wider range of stresses that call for greater enhancement of resilience techniques. This paper highlights the work of the Socio-Ecological Entanglement in Tropical Societies (SETS) project, whose goal is to investigate resilience and vulnerability within particular socio-ecological relationships among past tropical societies in South and Southeast Asia and Mesoamerica. The water management sub-project focuses on the availability, accessibility, and use of water resources. Stresses, such as climate change and increased urbanism, have created challenges to water conservation, both in ancient and modern times. An examination of these stressors on past water management in the SETS research sample, compared to those of the present-day, will provide insights and foster strategies toward the long-standing difficulties in producing “resilient cities” with greater levels of sustainability.

[214] *Chair*

March, Ramiro Javier (UMR 6566 CNRS CREA AH [France])**[173]** *Finding, Analyzing, and Interpreting Organic Matter in Archaeology: A Complex Subject*

Reconstructing the history of organic matter in archaeological context presents a challenge. Organic chemical signatures are the consequence of complex natural and anthropic processes that must be decoded in order to understand their hypothetical significations. This task follows different epistemological, methodological, and practical choices and needs to integrate knowledge from different disciplines. As a consequence, the characterization of the different molecules is related to the original question, the methods put in practice, and differential hypothetical environmental processes. For example, soils, ceramics or stones, may contain organic matter from different anthropic activities that can be unique or repeated. Further, these artifacts can subsequently be exposed to different kinds of natural interactions. Experimental approaches try to solve these difficulties but sometimes can lead to new and interesting questions about supposed paradigmatic explanations. We present here some case studies showing this complexity and their evolving answers.

Marchand, Gregor [389] see Naudinot, Nicolas

Marciniak, Arkadiusz [95] see Biehl, Peter F.

Marcone, Giancarlo**[170]** *The Rise and Fall of the Bi-Headed Serpent: How Much of Late Lima Cultural Development Could Be Explained by an ENSO?*

In the present paper, I will combine evidence of two sites: The Pachacamac Sanctuary and the domestic site of Lote B, both in the Lurín valley in order to discuss the political changes happening in the central coast to the onset of the middle horizon. Asking how these political changes related with the climatic variation register for the area in both bottom sea and lake cores. I point out that this process of political centralization was contemporaneous with mayor climatic anomalies that have been proposed correspond of an ENSO. In specific, I will explore how the rise of a new political organization (called Late Lima) and their posterior dismiss related with this recorded climatic phenomena. At what level the transit of the Lima population at the Lurín Valley from independent communities under the Lima milieu, to be part of a local based Late Lima state. This state that finally disappear not leaving trace of occupation by the second half of the Middle Horizon. How much of these rise and fall of Late Lima was consequence of natural phenomena.

Marder, Ofer**[338]** *Chair*

Marder, Ofer [338] see Barzilai, Omry

Marder, Ofer [338] see Sarig, Rachel

Marean, Curtis (Arizona State University), Jacob Harris (Arizona State University), Jessica Thompson (Emory University) and Kiona Ogle (Northern Arizona University)**[85]** *A Bayesian Solution to the Controversy over the Identification of Bone Surface Modification in Paleoanthropology*

Bone surface modification (BSM) remains a primary source of taphonomic inference in paleontological and archaeological contexts. However long-standing debates in BSM studies have undermined the utility of this approach. We use an objective machine-based learning algorithm rooted in Bayesian probability theory designed to quantify the level of uncertainty associated with a formal assignment of agent to individual BSM. Our multivariate Bayesian model, trained on large assemblages of experimentally generated BSM, accurately assigned agent of modification to an out-of-sample test with an average of 86.5% accuracy. Here we present the results of our updated probability model. We improved upon our existing model with the introduction of novel variables and an increased sample of experimentally generated training data produced by Nile crocodile feeding, spotted hyena feeding, large ungulate trampling, and human unmodified rock butchery. Here we also present the posterior distributions of model parameters associated with the morphology of individual BSM. Certain BSM attributes frequently associated with stone tool butchery marks (e.g., perpendicular orientation relative to the long axis of the bone, occur as a result of nonhuman agents of modification. Here we quantify the probability that key attributes are likely to occur with each respective agent of modification.

Marean, Curtis [85] see Fisher, Erich

Marek-Martinez, Ora (Northern Arizona University- Native American Cultural Center)**[108]** *Moderator***Marengo, Nelda I. (University of California Riverside)****[329]** *Integrating and Disintegrating the North Acropolis of Yaxuna, Yucatán, Mexico*

The North Acropolis of Yaxuna was the primary focus of ritual and administrative life at the site during the Classic period and functioned as a focal point for involving the local population in integrative activities. Yet architectural evidence suggests that this architectural complex changed in function over the course of its use. The acropolis was first built in the Late Formative and was modified up until the Late Postclassic. We argue that the changes we see in the architecture in this complex had to do with changing social and political relationships with other sites across the Maya lowlands just as much as they had to do with internal processes. In this paper we try and understand the types of activities undertaken at the acropolis through the analysis of material artifacts from a large trash pit associated with the complex. Copious amounts of ceramic, lithic, and bone materials, particularly from the Late and Terminal Classic periods, shed light on the types of activities undertaken at this group and help us contextualize processes of integration and disintegration.

Marengo, Nelda I. [44] see Tucker, Carrie

Margaris, Amy (Oberlin College)**[315]** *Discussant*

Marín Arroyo, Ana B. [165] see Jones, Jennifer

Marin-Aguilera, Beatriz (University of Cambridge)

[166] *Interweaving Colonial and Local Networks: Textile Production in Early Iron Age Iberia*

The role of textile production and consumption in the formation of Early Iron Age states in Mediterranean Europe has been often neglected in favor of other economic activities such as pottery making and distribution, as well as metallurgy. In the Western Mediterranean, connectivity has been mainly addressed through the study of Phoenician and/or Greek pottery in local settlements and vice versa. However, intensive production and consumption of textiles was at the heart of urbanization throughout the history of the world. Cloth was used as an ethnic and identity marker, as a tribute, as a trade product, and as an elite way of self-promotion, among many other things. Textile production and consumption are thus a fruitful venue to understand colonial relations in the region, as well as the interactions between both local communities and between them and the colonizers. In this paper, I focus on those interactions exploring several case studies of textile production in Iberia from the eighth–fifth centuries BC.

Marinho, Luisa (Simon Fraser University), Shera Fisk (Simon Fraser University), Ellie Gooderham (Simon Fraser University), Laure Spake (Simon Fraser University) and Hugo Cardoso (Simon Fraser University)

[235] *The Effects of Bilateral Asymmetry in Long Bone Length on Juvenile Age Predictions*

Diaphyseal lengths are routinely used to estimate age in juvenile skeletal remains. However, the effects of bilateral asymmetry in bone growth on the estimation of age have not been properly addressed. This study uses a sample of 26 individuals of known age (birth to 11 years) from the skeletal collection housed at the Natural Museum of Natural History and Science, in Lisbon, Portugal. Diaphyseal length of the humerus, radius, ulna, femur, tibia and fibula, were collected from the right and left sides. Differences between the sides were statistically significant for the radius, ulna and femur ($p < 0.009$). Three age estimation methods were used to assess the impact on point age estimates. Overall, formulae provided by Cardoso et al. (2014) and Primeau et al. (2016) seem to overestimate age at death, more noticeably on the right side. Inversely, Stull et al.'s (2014) method always underestimates age, particularly on the left side. Although the side from which the bone was selected affects age estimates, these results suggest that selecting the appropriate age estimation method is more important.

Marinho, Luisa [235] see Gooderham, Ellie

Marinkovich, Erik [83] see Cortes-Rincon, Marisol

Marinkovich, Erik (University of Texas at San Antonio), Marisol Cortes-Rincon (Humboldt State University), Jennifer Leonard (Humboldt State University) and Cady Rutherford (University of Texas at San Antonio)

[101] *Hinterland Causeways in the Maya Lowlands of Northwestern Belize*

This paper will present preliminary results of archaeological investigations concerning the spatial arrangement of hinterland causeways and their function within inter and intrasite exchange networks. This research is a subsidiary project of the Dos Hombres to Gran Cacao Archaeology (DH2GC) Project, a transect settlement survey analysis of hinterland communities situated between the sites of Dos Hombres and Gran Cacao, in northwestern Belize. A primary goal of this research is to explore the role of causeways as conduits of market exchange linking the resource zones of highly dispersed populations in the periphery of centralized administrative centers. This will provide unique insight into the complexity of two way relations between administrative sites and hinterland communities. An understanding of interactions between these interdependent entities will allow for a clearer interpretation of sociopolitical and economic spheres of influence.

Marino, Marc (University of Arkansas), Lane Fargher (Centro de Investigación y de Estudios Avanzados de), Richard Blanton (Purdue University), Verence Y. Heredia Espinoza (Centro de Estudios Arqueológicos, El Colegio de Mi) and John K. Millhauser (North Carolina State University)

[215] *Chipped Tool Production and Exchange in Late Postclassic Tlaxcallan: Integrating Specialized Production with the Political Economy of a Collective State*

Archaeological and ethnohistoric research has demonstrated that political-economic strategies in Late Postclassic (AD 1250–1521) Tlaxcallan were highly collective. At the same time, recent cross-cultural research indicates that collective political structures are strongly correlated with internal revenue sources, or taxes and *corvée* paid by free citizens. Thus, we hypothesize that Tlaxcaltecan political architects established internal revenue strategies to fund state activities. If this were the case, we would expect that goods were distributed through either large-scale redistribution or through open and competitive markets (as commodities). In this paper, we test this hypothesis by drawing on a dataset of roughly 5,700 obsidian artifacts yielded by excavations in two Late Postclassic residential terraces located within the city of Tlaxcallan. These data demonstrate that imported obsidian was widely used as a bulk economic resource. Thus, although obsidian was difficult to acquire due to Tlaxcallan's antagonistic relationship with the Aztec, the distribution of obsidian was not controlled for political gain (e.g., distributed as gifts through embedded exchange systems). Thus, this paper contributes to broader studies of economy in Central Mexico by illustrating alternative paths to production and exchange available to consumers.

Marino, Marc [71] see Meissner, Nathan

Mark, Robert (Ruperstrian CyberServices)

[273] *Chair*

Mark, Robert [273] see Billo, Evelyn

Marken, Damien (Bloomsburg University) and David Freidel (Washington University of St. Louis)

[131] *Documenting Classic Maya Urban Landscapes: Comparing and Integrating the Results of Lidar and Topographic Survey at El Perú-Waka', Petén, Guatemala*

Hidden by the dense forest canopy of the Petén, the size, shape and form of Classic Maya cities have remained difficult for archaeologists to document in their entirety. In recent years, however, the application of Light Detection and Ranging (lidar) technologies have enabled the rapid acquisition of topographic data for large swaths of the Maya lowlands. These previous investigations, primarily in Belize, Mexico, and Honduras, demonstrate, however, that the quality and required steps in processing and analysis of lidar data is highly variable, often dependent upon variations in vegetation

type and coverage. This paper examines the results of a recent lidar survey of the Classic Maya site of El Perú-Waka' located in the western Petén, Guatemala. Over the last 15 years El Perú has been subject of intensive and extensive topographic mapping and full-coverage survey. These "traditional" survey data provide a vital comparative dataset with which to examine the strengths and weakness of lidar data in the Petén.

Markens, Robert [9] see Lopez, Cira Martinez

Markens, Robert

[288] *Butterfly Imagery among the Classic Period Zapotecs of the Valley of Oaxaca*

This paper explores the meaning of butterfly imagery among Classic period Zapotecs of the Valley of Oaxaca. Images of butterflies, or parts of their anatomy, sometimes appear on effigy vessels found in tombs. The effigy vessels represent rulers, or other individuals of high social-standing, as jaguars, owls or the Fire Serpent. I argue that rulers of Zapotec urban centers were perceived to have a number of specific naguales or alter-egos that constitute the moral basis of political power. The inclusion of butterfly elements in effigy vessels conveys the ruler's faculty of transformation into his/her spirit companions.

Markin, Julie G. [365] see Smith, Karen

Marklein, Kathryn [252] see Fu, Janling

Markofsky, Steve (CaSEs Research Group, Pompeu Fabra University)

[57] *There's Sand in the Sensor! EO Approaches to Interpreting Delta-Desert Transitional Environments*

The complex boundary regions between deltas and deserts pose particular difficulties for archaeological enquiry. In these regions, the dynamic interactions between aeolian and alluvial processes result in continuously changing hydrosocial landscapes that manifest over a range of spatio-temporal analytical scales. The wealth of tools, methodologies and theoretical approaches offered by the burgeoning field of remote sensing can help to deconstruct complex and often visually obstructed human geographical landscapes. Arid-margin EO approaches have increasingly incorporated multispectral imagery, thermal IR imagery, synthetic aperture radar (SAR), and high-resolution UAV-based photography and photogrammetry to deconstruct marginal and transitional landscapes, and to highlight the implications for those societies who inhabited them, as well as the modern-day researchers who seek to understand them. This paper presents a set of EO techniques to examine hydrosocial landscapes in the distal zone of the endorheic Murghab delta in Turkmenistan, and the potential to deconstruct these types of environments using aerial and satellite-based sensing techniques. Using an integrated approach, the paper evaluates the effectiveness of multispectral analysis, thermal imagery, landscape morphometry, UAV based imagery, classification algorithms and SAR data to develop an effective and transferable set of methods for examining these unique transitional zones.

Marks, Theodore (University of Iowa), Grant McCall (Tulane University), James Enloe, Andrew Schroll (University of Iowa) and James McGrath (University of Iowa)

[54] *Sourcing Lithic Raw Materials in the Namib Desert: Exploring Land Use and Technological Organization*

Under a technological organization perspective, archaeologists seek to understand how prehistoric societies organized their activities across landscapes and how variation at individual sites articulates with changes in large scale land use systems. Lithic sourcing offers a powerful tool for testing hypotheses about technological organization and land use, but its application across the globe has, until recently, been hindered by expense and methodological difficulties. In this paper, we use pXRF and ICP-MS and the results of a two-year geological sampling survey to source a large sample of artifacts from three late Pleistocene sites in the Namib Desert. Our analysis shows that prehistoric groups who made very different types of stone tools also used the Namib's landscape in different ways along a continuum of variability. Middle Stone Age groups appear to have focused subsistence activities in fertile river beds while Later Stone Age people appear to have had novel mobility patterns, exploiting coastal zones as well as much wider ranges in the desert. Our data provide some of the first empirical insights into land use and mobility systems employed by Upper Pleistocene populations in Southern Africa and have important implications for regional studies as well as the broader "MSA/LSA transition."

Marks, Theodore [153] see Schroll, Andrew

Marquardt, William (University of New Mexico, U.S. Forest Service), Jill Bassett (Assistant Forest Archaeologist, Umatilla National), Allen Madril (Heritage Program Manager, Umatilla National Forest), Paula Brooks (Forest Botanist, Umatilla National Forest) and John Marshall (Photographer, John Marshall Photography)

[343] *I'm Your Huckleberry: Monitoring Impacts on Traditionally Utilized Food Sources of the Pomeroy Ranger District, Umatilla National Forest, Southeastern Washington*

The utilization of traditional foods in the Columbia Plateau on ceded tribal lands is of great importance to present day indigenous communities within the region. Huckleberries (*vaccinium* spp.) are one of these highly valued traditional food stuffs among the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and the Nez Perce among others. However, the impacts of forest projects (i.e., logging, and prescribed burning) on this reserved treaty resource are poorly understood. Bearing that in mind, Umatilla National Forest Heritage staff members Jill Bassett, Allen Madril, and Will Marquardt, along with forest botanist Paula Brooks and professional photographer John Marshall, monitored 15 huckleberry patches in the South George Creek watershed west of the community of Anatone, WA, that were undergoing logging and prescribed burning treatment. Panoramic photographs were taken before and after treatment and 15 m transects were conducted to ascertain huckleberry cover, production, and canopy cover. Sites were visited before and after treatment and revisits are planned for the following five years. With this data, heritage staff on the Umatilla National Forest along with local tribes may be able to provide better recommendations regarding project impacts on an overlooked but vital cultural resource

Marreiros, Joao (ICArEHB, FCHS, Universidade do Algarve [Portugal])

[40] *Chert versus Quartzite Edge Reduction Using a Mechanical Device and Its Relevance to Lithic Raw Material Variability, Selection, and Use*

Lithic raw materials diversity in archaeological assemblages is used to address a multiplicity of fundamental questions concerning the evolution of human behavior. Technological systems are considered to be the result of conscious human choices, likely related to different types of rocks characteristics, performance and effectiveness. To test this model, we developed an experimental program using hand-knapped standardized blades on quartzite and chert in an upgraded version of a mechanical device, in order to improve experimental controlled conditions. The differences between the

performances of these two raw materials bring insights into why they systematically make two completely distinct tool kits in periods such as the Upper Paleolithic.

[40] Chair

Marsden, Susan (Museum of Northern British Columbia) and Andrew Martindale (University of British Columbia)

[176] *The Challenges and Benefits of Comparing Archaeological and Oral Records*

Archaeologists have referenced the oral record throughout the history of their research in Tsimshian territory. In this paper we frame our recent collaboration against this legacy and argue that that a symmetrical relationship is a necessary foundation for any conjunction between these complex datasets. Our collaboration recognizes the common history they represent, but also their different logical frameworks and empirical scope. In our context, the oral record was more complete, detailed, and comprehensive than the archaeological view of history. Thus, our first impulse toward history has come from indigenous sources, which subsequently framed our archaeological research questions. Our point of greatest overlap has been the macro-history of large-scale events, a subject covered extensively in the oral record and accessible via a regional view of archaeological data. We have consistently found that the oral and archaeological records conjoin when considered in this approach.

Marsh, Ben [27] see Kealhofer, Lisa

Marsh, Erik (CONICET, Laboratorio de Paleo-Ecología Humana, UNCuyo, Argentina)

[81] *Accelerating History and Bayesian Models: The Rapid Emergence of Agropastoralism and the Tiwanaku State in the Lake Titicaca Basin, South America*

Long-term cultural change can be nonlinear and punctuated by brief episodes of accelerating history. Such episodes, or emergent phenomena, have been described by a diverse set of theoretical approaches such as complexity theory, complex adaptive systems, panarchy, resilience theory, "eventful" sociology and archaeology, and the Annales School of History. These episodes can result in profound, lasting changes for large groups of people, but can happen too fast to be clearly documented without Bayesian models. This paper presents Bayesian models of two episodes of rapid change in the Lake Titicaca Basin in highland South America, based on more than 250 radiocarbon dates. First, after millennia of foraging, agropastoralism emerged ~1590–1170 cal BC and remains the dominant economic adaptation today. Second, the Tiwanaku state emerged cal AD ~430–590, a primary state that grew to project a dominant hegemony in the central Andes for five centuries. In contrast to evolutionary expectations, the *longue durée* in the Lake Titicaca Basin was punctuated by brief episodes of rapid change. Bayesian models are the first step toward characterizing these episodes, detangling the synergistic interactions that generated them, and making comparisons to similar episodes in other parts of the world.

Marshall, Amanda (Kleanza Consulting) and Stephanie Huddleston (Kleanza Consulting Ltd.)

[176] *The Kleanza Approach: The Challenges of Working in Tsimshian Territory from a Cultural Resource Management (CRM) Perspective*

Working in Tsimshian territory as consulting archaeologists can be challenging at best particularly in recent years as a growing number of proposed development projects has put the Northwest Coast in the provincial and federal spotlight. As a company we strive to ensure our research objectives are guided by community heritage policies; however, given the nature of the business, we are influenced by our client's requests, confidentiality, binding contracts, budgets, and provincial guidelines. Economic climates affect our competitive structure, staffing, salaries, and hourly charge out rates. It seems some consulting archaeologists prefer a simplified cookie-cutter approach collecting baseline data to satisfy research parameters outlined in a provincial permit. The challenge we face is how do we remain competitive but also remain in support of our local communities. Regardless of our intentions we are always caught in the middle between the client and community. We present a recent project in Metlakatla territory as a case study to examine how the work unfolded, and how the scope of work was influenced by the community, our client, and other stakeholders. We compare this to other projects we have completed in the region which have been collaborative and community based in our approach.

Marshall, Fiona [154] see Goldstein, Steven

Marshall, Yvonne

[208] *Creating, Enduring, and Transforming: Pots and People in Southern Taiwan*

This paper seeks to reframe archaeological thinking on what constitutes "an object" and how such objects endure through time. I will consider the changing presence of pots among the Paiwan people of southern Taiwan over the past 2,000 years. The Paiwan are understood to have "lost their pots" at least 100 years ago, in the sense that they chose to stop making them. This "loss" has been presumed to result from Chinese and Japanese colonial interventions during the nineteenth and twentieth centuries. However, newly emerging archaeological evidence from the Southern Paiwan Project directed by Prof. Maa-ling Chen suggests pottery production may have ceased many centuries earlier than previously thought. Although the Paiwan do not now make pots, and may not have made pots for quite some time, pots remain central to Paiwan ontology; to how they understand themselves to be in the world and how they position themselves in today's world. The continuing significance of pots, and their frequent incorporation into highly invisible public architecture, calls into question simple assumptions about "loss" and about the ways objects remade materially, and made meaningful as cultures transform.

[65] Discussant

Marston, John [21] see Graff, Sarah

Marston, John (Boston University) and Canan Çakırlar (University of Groningen)

[27] *Provisioning and Agricultural Economy at Roman Gordion: Integrating Archaeobotany and Zooarchaeology*

Naomi Miller conducted extensive archaeobotanical research at the urban center of Gordion, in central Turkey, where she worked closely with zooarchaeologist Melinda Zeder to publish an integrated study of diachronic change in agricultural economies and land use. One period, however, was not included in this study: Roman Gordion, when the once-large city became a small military encampment. Drawing on the foundational effort of Miller and Zeder, we couple archaeobotanical data with new zooarchaeological data (taxonomic composition, mortality profiles, prevalence of weight-induced pathologies, and biometry) in an effort to characterize the agricultural economy at the Roman military base of Gordion. We propose a model where the garrison developed durable social and economic relationships with rural farmers, who provisioned the site with wheat and young cattle, and local pastoralists, who focused on secondary products and provided mainly older caprines to Gordion. Economic risk was further managed by the garrison through household husbandry (of pigs and chickens), while environmental risks were managed by farmers using intensive irrigation but exacerbated by extensive pastoral production. Gordion, as a rare integrated faunal and botanical study of the Roman Near East, provides a model for further study of the Roman agricultural economy in the eastern provinces.

[285] Chair

Martens, Tracy (Australian National University)

[222] *Fiber Technology from Caleta Vitor, Northern Chile*

In 2008, Chris Carter of the Australian National University (ANU) and Calogero Santoro of Universidad de Tarapacá de Arica (UTA) excavated at Caleta Vitor, located at the coastal mouth of Quebrada Chaca in northern Chile. The site was occupied from at least 13,000 BP through to the Spanish invasion and came to world attention when it was featured on ABC Catalyst (ABC iView, 2009). This research project is aimed at identifying and establishing the provenience of the well preserved textiles and other fiber artifacts from the site. The report presented here details the initial findings from my survey of the collection conducted April to July 2016. The research is a part of my doctoral project and was conducted under a memorandum of understanding between the UTA and ANU.

Martens, Vibeke Vandrup (NIKU—Norwegian Institute for Cultural Heritage Research), Michel Vorenhout (MVH Consult, the Netherlands), Ove Bergersen (NIBIO—Norwegian Institute of Bioeconomy Research), Paula Utigard Sandvik (Archaeological Museum, University in Stavanger, No) and Jørgen Hollesen (National Museum of Denmark)

[224] *Mitigating Climate Change Impacts on Heritage Sites?*

How fast do archaeological deposits, soil features and artifacts degrade? Is it possible to preserve archaeological remains in situ without significant loss of information potential? Climate change causing higher temperatures, increased and more concentrated precipitation events, changes from snow to rain, may lead to an irrevocable loss of information. Even small changes in the conditions of deposition, as caused by the global environmental development or local structural changes, may accelerate deterioration. This paper presents archaeological observations and results of paleoecological and geochemical analyses of archaeological deposits from two rural sites in northernmost Norway. These are combined with climate data and the first period of continuous monitoring of soil temperature, moisture and redox potential in sections. This data constitutes the basic research material for evaluations of conservation state and preservation conditions. The data has been collected in an interdisciplinary research project. The results have consequences for the heritage management of a large number of sites from all periods. Paleoecological analyses and redox measurements have revealed ongoing decay that might not otherwise have been detected. Decay studies indicate that both site types may be at risk with the predicted climate change. Some strategies for mitigation and management are suggested.

Martin, Andrew (Principia College)

[396] *Native Science: How a Native American Understanding of Ritual as a Science Can Help Archaeological Analysis*

In the last couple of decades, Native peoples across the world have become more vocal that indigenous rituals are not the result of religious superstition or mechanisms of social control, but the formulae of indigenous sciences. Ceremonies and many myths, they argue, have been mistakenly categorized as religious by anthropologists due to their baroque appearance and our modern separation between nature from culture. Gregory Cajete and Leroy Little Bear have led the movement to recategorize rituals as scientific formulae—formulae that have long helped Native peoples survive by helping them understand, control and predict the world. However, few in archaeology have taken up the gauntlet. This paper addresses the background and philosophy that supports this conception of ritual, and attempts to apply it to better understand the archaeology of ritual monuments. While the ontological turn in archaeology has grasped the need to interpret archaeology according to the ontology of a given culture, it suffers from the same problem as analogical interpretation—models are imposed from a modern ethnographic group. However, if rituals are actually scientific formulae that define a culture's understanding of the world, temporally precise ontologies can be exacted from them and used to interpret cultural actions.

Martin, Erik (University of Utah)

[343] *Form and Function: Projectile Point Morphology and Associated Faunal Remains at Four Eastern Great Basin Cave Sites*

Spatial and temporal patterning of projectile point morphology continues to be a well discussed topic within the Great Basin. However, despite this attention, little progress has been made addressing the functional attributes of projectile points beyond the simple atlatl vs. bow dichotomy. Stratified cave sites offer a unique opportunity to study the relationship between hunting technology and prey choice through the analysis of projectile point characteristics and contemporaneously deposited faunal remains. This study examines several hypotheses related to ballistic performance, penetrative capabilities, and projectile morphology as related to prey size at four Utah archaeological cave sites: Danger Cave, Hogup Cave, Sudden Shelter, and Swallow Shelter. The study utilizes new and previously published faunal analyses in combination with landmark geometric morphometric analysis of a photographic database comprised of over 900 projectile points curated at the Natural History Museum of Utah.

Martin, Fabiana María [226] see Borrero, Luis

Martin, Lana (University of California, Los Angeles)

[229] *Using Ancient Plant Macroremains to Understand Resource Consumption in the Past and Present*

Many people recognize the need for markedly different mode of living amid a growing body of scientific evidence that the current world population is environmentally unsustainable. Exploring ancient foodways and landscape management techniques may improve our ability to imagine highly productive modes of food production and resource consumption dissimilar to that of our current global reality. Here, I show how a reconstruction of macrobotanical and faunal remains builds a narrative of anthropogenic forest development on a small island in Western Caribbean Panama during a period of rapid population growth and sociopolitical networking (ca. AD 500–1500). Using this example, we explore specific incremental changes that routine task performance and collective decision-making produce in vegetation and fauna, which in turn supported a growing human population of the past and remain visible in the archaeological record of the present.

Martin, Lois

[60] *Direction, Gender, and Cosmology in the Precolumbian Textile Technologies of Mesoamerica*

Despite the paucity of actual archaeological textiles in Mesoamerica, alternative sources provide a picture of precolumbian textile technologies. These include: Colonial-era depictions and descriptions, tools, and especially continuities to ethnographic practice. Together, these reveal the centrality of textiles to these societies, and even hint at how textiles conceptually embodied and reflected indigenous cultural norms and notions. I argue that these sources suggest some hitherto under-recognized broad, underlying principles that emphasize opposition and complementarity. For instance, there are striking, regular consistencies in traditional gendered work, between the axis and gender of the body of the user and the tool in action. "Female and horizontal" are consistently counter-posed to "male and vertical" in all of the following: spindle whorl to circular shield; loom batten to battle sword; pick-up stick to digging stick; backstrap loom belt to burden strap. Moreover, just as Desrosiers (and others) have found consistent alternations between thread direction and gender in Andean garments, so, too, in Mesoamerica, warps ran horizontally on women's skirts, and vertically on male loincloths.

While some scholars have proposed that every traditional cornfield reproduces Mesoamerican schemes of cosmic order, I will argue that hand-woven cloth—both past and present—traces cosmological outlines as well.

Martin, Simon (University of Pennsylvania Museum)

[39] *Copan in the Wider Maya World*

The peripheral location of Copan has always raised questions about the ways in which it related to the core of the Maya world. Clearly Copan was no isolate in the Classic Maya tradition, divorced from developments elsewhere, but what did it continue to draw from the center and what were the mechanisms underlying those contacts? What do we know about the influence of centrally placed polities in this far-flung region, which held a symbolic status in the far east, but could never be a significant participant in the affairs of the core? This paper focus on what we know of Copan's foreign interactions, suggesting modes of interaction that extended over considerable distances, yet seemingly differed little from those between near-neighbors.

Martin, Terrance (Illinois State Museum)

[21] *Bone Marrow as Part of the Local Cuisine at Fort St. Joseph, a French Fur Trade Post in Southwest Michigan*

Analyses of the large faunal assemblage from the eighteenth-century Fort St. Joseph site (20BE23) in Berrien County, Michigan, are becoming more concerned with the question of "food or furs?" With over 70% of the identified animal remains coming from white-tailed deer, we are trying to discern whether broken long bones are the result of removal of marrow for subsistence, or if they may have also been used to prepare hides. In contrast to late prehistoric and early historic Native American sites in the Midwest, the best quality marrow bones—the metacarpals and metatarsals—are underrepresented at Fort St. Joseph. This suggests that the lower leg skeletal portions were purposefully collected and taken elsewhere. If marrow and bone grease were processed as part of the local cuisine, why are deer metapodial fragments so rare in the habitation refuse? Were marrow bones being used in addition to brains as part of the hide tanning process away from the site area that has been excavated?

Martín Cao Romero, Carolina [225] see López Luján, Leonardo

Martindale, Andrew (University of British Columbia)

[227] *Building a Global 14C Database*

Since the launch of the upgraded Canadian Archaeological Radiocarbon Database (CARD) in April 2015, CARD has expanded to contain more than 70% of the world's online 14C archaeological dates across six continents. CARD's transformation into a global repository raises concerns about access, security, protocols, management, capacity, and the prospects and long-term future of a single, comprehensive global 14C archaeological database. CARD is a template for that global database. Here we present a comparison of the world's 14C databases and review their histories and capacities to situate CARD's growth and capabilities. We identify the common elements for a universal data platform and argue that such an ambition should be a priority for researchers and 14C laboratories.

[176] *Chair*

Martindale, Andrew [176] see Brown, Thomas

Martindale Johnson, Lucas [171] see Brandt, Steven

Martínez, América (Escuela de Antropología e Historia del Norte de México)

[201] *Cuevas arqueológicas al oeste de la Sierra Madre Occidental, Chihuahua: Las casas acantilado*

En esta ponencia se hablará de los sitios arqueológicos establecidos en cuevas conocidos como casas acantilado (cliff dwellings) asociadas a la cultura Casas Grandes, teniendo como punto de referencia la actual Zona Arqueológica Paquimé, la cual tuvo su momento de apogeo entre el año 1060–1340 dC. Este tipo de sitios tienen características muy específicas en cuanto a la formación del contexto arqueológico y todo lo que encontramos en él; es decir, gracias al microambiente que en este se genera, la variedad de materiales y elementos arqueológicos que podemos observar y recuperar son únicos, tanto en el sentido cualitativo como cuantitativo. Por otro lado, es muy importante destacar la ubicación geográfica que tienen las casas acantilado, es decir, sus características de asentamiento, y la relación que se tiene con las zonas ecológicas representativas de la Sierra Madre Occidental porción Chihuahua, la cual podemos conocer a través de los materiales de origen vegetal, específicamente. De esta forma, lo mencionado anteriormente nos ayudara a conocer un poco más sobre esta cultura serrana, así como el papel o rol dentro del complejo cultural Casas Grandes. De igual forma, el lugar que tales investigaciones ocupan en la arqueología del estado de Chihuahua.

Martinez, Antoinette [30] see Gardner, Karen

Martinez, Daniel (Epsilon Systems Solutions, Inc.)

[189] *Repeat Photography and Cultural Resource Management: A Case Study from Glen Canyon, Arizona*

Repeat photography, the collection of multiple photographs of the same subject from an identical location, is an effective technique for documenting the natural and cultural processes impacting archaeological sites, yet remains underutilized in cultural resource management. Analysis of repeat photographs may yield important data for understanding the processes affecting site integrity, which could result in improved site preservation and management. In this paper, repeat photographs collected over a twenty-year period are analyzed to assess the impact of three high-flow experiments (HFEs), controlled water releases from Glen Canyon Dam, on an archaeological site located downstream in Glen Canyon. To conduct the analysis, I used Adobe Illustrator and Photoshop to document observed changes and estimate the percentage change between images using the grid intersect method developed by Hall (2002). The analysis demonstrated erosion caused by HFEs has decreased since 1996, likely resulting from a 200% increase in riparian vegetation along the terrace cutbank and changes in HFE management. These observations indicate repeat photography is a suitable monitoring technique for documenting the long- and short-term changes to archaeological sites and cultural landscapes, the results of which are easily discernible to resource managers and stakeholders.

Martinez, Desiree (Cogstone Resource Management)

[334] *Recognizing Indigenous Settlement Patterns: Results from Pimu (Catalina Island, California)*

For 10 years, the Pimu Catalina Island Archaeology Project (PCIAP) has worked with the Gabrieliño (Tongva) community to create a research agenda that acknowledges the Tongva's cultural knowledge of the environment. Based on an Indigenous archaeology approach, PCIAP's work recognizes that

previous interpretations of Island Tongva settlement patterns do not accurately reflect how the Island Tongva viewed themselves upon the landscape nor their relationships to the people and items around them. This presentation will discuss alternative ways of viewing the landscape and Pimu settlement patterns, framed Gabrielino (Tongva) worldviews.

[63] *Discussant*

Martínez, Estela

[94] *Cosmogonía y ritualidad en contextos funerarios de Tamtoc, SLP, México*

En antropología, la muerte es considerada un hecho natural universal con expresiones socioculturales fundamentadas en la cosmogonía de cada grupo humano, y es a través de los rituales funerarios que se marca la conexión simbólica entre la vida y la muerte, que se expresa tanto en el plano material-biológico (cadáver y lugar de destino final) como en el espiritual (trascendencias, creencias y escatología); en tanto que, la muerte, como hecho objetivo y como hecho cultural ritualizado, delimita el concepto de la vida y reflejan la percepción y construcción imaginaria de un mundo paralelo ubicado en el más allá como una manera de resolver un problema esencial de la existencia humana. Así, el fenómeno natural de la muerte adopta un significado social cuyo sentido cultural lleva al plano de la valoración y respeto del ámbito sagrado-profano, configurando el orden religioso o la cosmovisión de las sociedades. Lo anterior motivó la inquietud de presentar este trabajo acerca de los distintos rituales funerarios que consideramos se llevaron a cabo en diversos sectores de la antigua urbe de Tamtoc durante el periodo posclásico (900 a 1521 dC), como expresión particular de la cosmovisión de sus antiguos habitantes.

Martínez, Jupiter (INAH-Sonora) and Amanda Ríos (INAH-Sonora)

[201] *Rancho la Cueva: Agaves and Casas Grandes in a Cliff Dwelling*

La Cueva is a cliff dwelling built by the Casas Grandes people in the Sierra Madre Occidental in Sonora, Mexico. It has been studied by the Sierra Alta de Sonora Archaeological Project with the aim of understanding the Subregional System on the mountains. So far, we have identified a protohistoric component and a prehistoric occupation from the Viejo and Medio Period (AD 900–1450). But the most relevant information is related with the mezcalters knives, an industry well identified. At the site, we have evidence for the whole sequence of collecting, processing, and using agave. The presentation will describe this data.

Martínez, Marcos, Alexandra Greenwald, Jelmer Eerkens, Alex de Voogt and Vincent Francigny

[219] *Inter- and Intra-individual Dietary Variation among the Agro-Pastoralist Sai Island Meroitic Population*

We examine inter- and intra-individual variation in diet among high-status individuals from an agropastoralist Meroitic burial population interred on Sai Island in modern Sudan. We use stable isotope data ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) from dentinal collagen, extracted from serial micro-sections of third molars, to reconstruct the diet of 10 individuals. We employ MixSIAR, a hierarchical Bayesian model for estimating isotopic mixing, along with a previously constructed isotopic food-web to reconstruct human diets. We find variation between individuals, and within individuals over the period of third molar growth (age 9–22 years), in the relative inclusion of C3 and C4 plant agricultural products, domesticated animals, and aquatic resources from the Nile River.

Martínez, Valentina and Tamra Walter

[220] *The Manteño of Coastal Ecuador: A Case of Territorial Expansion in a Diverse Environment*

Inter- and intraregional expansion across a large geographically and environmental diverse terrain was a distinctive feature of the Manteño culture (1500 BP–1532) of coastal Ecuador. Using survey data collected by FAU Field School investigators, this paper explores the development of a large sociopolitical unit that encompassed diverse settlement types exhibiting a uniform ceramics. It is likely that this unit was described ethnohistorically as the Señorío de Salangome, one of at least four chiefdoms attributed to Manteño culture. The paper focuses on the process of territorial expansion of Salangome, implemented some 100 years prior to the arrival of the Spanish, a strategy that centered on the direct control of diverse environmental zones. The case of the territorial expansion of Salangome provides some direction toward an overall understanding of Manteño culture and its chiefdoms.

Martínez, Valentina [220] see Garzon-Oechsle, Andres

Martínez Ceceña, María Yanire (Archaeology)

[328] *Internal Control and Management of Cultural Tangible Assets in Mexico: A First Step to Their Protection*

Mexico is a country with a cultural heritage that has given him a unique identity. We have a wealth of collections ranging from the paleontological and archaeological, to the historical and ethnographic. These collections require a control that will allow both federal institutions and individuals to be aware of what they have under their care, as it is one of the serious problems they face today. One of the main objectives of this brief presentation will be: To give an insight into the control and management of collections in a general framework that will allow those responsible for guarding these tangible assets to know the existence of easy and practical ways to bring to fruition this task and ensure full compliance with the laws. At the same time, raise awareness among federal authorities and civil associations that they have in their hands the care and preservation of the cultural heritage of the nation.

Martínez-Cruzado, Juan Carlos [156] see Roman Buso, Gabriela

Martínez López, Cira [9] see Lopez, Cira Martinez

Martínez Mora, Estela [183] see Hernandez Espinoza, Patricia

Martínez Tagüña, Natalia (Instituto Potosino de Investigación Científica y Tecnológica A.C.)

[84] *Applied Ethnobotany in Arid Lands: The Importance of Time, Context, and Collaboration*

This paper contributes to the field of applied ethnobotany, which focuses on the role that knowledge, institutions and cultural perspectives play in resource management and conservation (based on Cunningham). Through different case studies to understand people and their use of wild desert plants, this paper stresses the importance of collaboration between disciplines, principally among biological and social sciences; and secondly between formally trained researchers, and local people and resource users. It also highlights the importance of employing archaeological data to better understand resource use through time and at various contexts. The ultimate goal is to achieve a sustainable use of the arid lands biodiversity today and

in the future. This effort is inspired by the example of Suzanne Fish and Paul Fish whom I have had the privilege of learning from. Where among many valuable lessons, community outreach and innovative archaeological research are central to their work. Therefore this paper is also a methodological contribution to the field of community archaeology, an archaeology that it is done by the people for the people.

Martínez-Yrizar, Diana (IIA-UNAM) and Carmen Cristina Adriano-Morán

[274] *Seeds for the Gods: Chía (Salvia Hispanica) in Teotihuacán Ritual Offerings*

Over the last decades, as a result of archaeological research inside of the Sun and the Moon pyramids in Teotihuacán, significant concentrations of chía (Salvia hispanica) seeds have been recovered in association with ritual contexts. This is particularly true in Offering 2, pit 59 of the Sun Pyramid and in Burial 6 of the Moon Pyramid. The archaeological artifacts were similar in both contexts, for example Tlaloc vessels, projectile points, pyrite disks and faunal remains, among others. In this paper we explore the possibility that the presence of chia seeds in these offerings could be related to worship of the water deity. In Teotihuacán iconography, priests are frequently observed scattering liquids with seeds (possibly chía) and this action has been interpreted as part of the ceremony to petition for water. This suggests that the chía plant and seeds display characteristics that represent attributes or can be associated with that deity.

Martínez-Yrizar, Diana [13] see Acosta-Ochoa, Guillermo

Martinón-Torres, Marcos (UCL Institute of Archaeology), Xiuzhen Li (First Emperor's Mausoleum Site Museum, Xi'an, Chin) and Andrew Bevan (UCL Institute of Archaeology)

[323] *Reverse Engineering China's Terracotta Army through Morphometric and Spatial Analyses*

Built in the third century BC, the Mausoleum of China's First Emperor is one of several very large known constructions commissioned by early states and empires. Understanding the craft processes and production organization behind such constructions is informative to historians of technology but also as a potential indicator of wider institutional practices for the management of labor, materials, and knowledge, which may facilitate comparisons between different states. The lack of associated production remains, however, makes such a study particularly challenging, and it requires tailored research methods. Here we present the methods and main results of an ongoing joint project that seeks to characterize the logistical organization of the Qin state as seen through the reverse engineering of the Terracotta Army. We focus on the combination of morphometric and spatial analyses of the warriors, their bronze weapons, and marks and inscriptions found on them. These allow us to infer logistical aspects of the production process, from the organization of the workforce in cells, through the interim storage of artifacts, and up to the processes leading to their final deposition in the Mausoleum. We will discuss implications of these results in the broader context of an emerging empire.

Martinón-Torres, Marcos [58] see Li, Xiuzhen

Martins, Rui [40] see Marreiros, Joao

Martisius, Naomi L. [169] see Steele, Teresa

Martisius, Naomi L. (University of California, Davis)

[282] *A Comparative Assessment of Upper Paleolithic Lissor (Smoother) Manufacture and Use*

Recent studies have brought focus to a category of bone tools previously thought to be restricted to modern humans. Excavations of layers dating to approximately 50 kya from two different sites in southwest France, Pech-de-l'Azé I and Abri Peyrony, have produced four nearly identical fragments of bone tools identified as lissoirs (a French term meaning "smoothers"). Lissoirs are specialized tools thought to have been used in hide preparation. Although this tool type has been defined in various ways, lissoirs have typically been described as elongated with a rounded, often polished, distal end. Little to no research to date has focused on the various aspects of lissoirs manufacture and use. Here, I present preliminary analytical and experimental data focused on understanding the variation and standardization of Upper Paleolithic lissor technology at several Paleolithic sites. This study spans a temporal range from the early Aurignacian through the final Gravettian. Increasing our understanding of Upper Paleolithic lissor technology will better allow the eventual integration of Middle Paleolithic bone tool manufacture and use into a higher-resolution picture of Paleolithic technology.

Martz, Hans (Escuela Nacional de Antropología e Historia) and David Wood (Universidad Autónoma Metropolitana)

[94] *Análisis calendárico de las orientaciones astronómicas de la arquitectura de Tamtoc, San Luis Potosí: La importancia de su latitud geográfica y el uso del paisaje*

En la actualidad la Zona Arqueológica de Tamtoc, un área cívico-ceremonial prehispánica de larga duración, presenta un porcentaje considerable de estructuras liberadas, cuya arquitectura expuesta ha permitido al Proyecto Arqueológico Origen y Desarrollo del Paisaje Urbano de Tamtoc, dirigido por Estela Martínez y Guillermo Córdova, el realizar un estudio metodológico de sus orientaciones y las posibles relaciones que guardan entre ellas. Cabe decir que este tipo de trabajo genera un antecedente significativo para las futuras exploraciones y los informes que ellas conllevan. Desde que realizamos las primeras mediciones arqueoastronómicas, bajo un procedimiento minucioso, sabemos que la ciudad estaba orientada astronómicamente con fines calendáricos y rituales. En primer lugar, haremos una revisión de las estructuras ya estudiadas y de sus orientaciones, las cuales se representan a través de intervalos de días. Explicaremos brevemente a que se debe lo anterior, por ejemplo, mediante la importancia que en Tamtoc dieron a los solsticios. A ello seguirá una ligera muestra estadística de dichos intervalos calendáricos. Finalmente daremos a conocer sus propiedades y algunos ejemplos de su uso, entre los que destacaremos el de los pasos cenitales de Tamtoc, el intervalo de veinte días en su contexto natural.

Martz, Hans [94] see Fiehring, Benno

Marwick, Ben (University of Washington)

[333] *Moving on from Movius: Recent Research in Pleistocene Archaeology in Myanmar*

For many archaeologists, Myanmar is known as the place where Hallam Movius proposed the Movius Line as a result of his fieldwork in the 1930s. Movius proposed this line as a major cultural boundary of the Paleolithic era, with bifacial technology present in the west and north, but absent to the south and east. His line continues to have a major influence on contemporary discussions of human evolution in the Eastern Hemisphere. Motivated by debates about the line, and other questions about the place of Myanmar in the modern human colonization of Southeast Asia and Australia, I began

fieldwork with local collaborators in Myanmar in 2016. In this talk I present results from the first research at Pleistocene sites in Myanmar since Movius' expedition. I discuss the implications for the debates about the line, and about broad patterns of human evolution in Southeast Asia.

[112] Moderator
[149] Discussant

Marwick, Ben [113] see Kelley, Eric
Marwick, Ben [113] see Hu, Yue

Mas Florit, Catalina (JIAA, Brown University) and Miguel Ángel Cau Ontiveros (ICREA and Universitat de Barcelona)
[166] *Inland Connectivity in Late Antique Mallorca (Balearic Islands, Spain)*

The Balearic Islands lie in a strategic position within the Western part of the Mediterranean and played an important role in the trade routes crossing the Mare Nostrum. Therefore, connectivity of the island by sea has always been considered. However, inland connectivity has not been addressed in detail probably due to the lack of information on communication routes. The paper explores the inland connectivity of sites in the late antique landscape based in a combination of spatial analysis and field survey. Possible communication routes have been simulated using GIS by Least Cost Path Analysis. The archaeological and survey data of late antique sites in the Eastern part of the island have been examined in order to understand the location of the sites and its connectivity within the landscape. The results show that—even in a landscape where the knowledge of its communication routes is limited—a detailed study of the landscape and of the distribution of the sites, complemented with spatial technologies can help to advance an interpretative framework for inland connectivity in late antique Mallorca, an aspect relatively poorly explored so far.

Maschner, Herbert (University of South Florida)
[312] Discussant

Mason, Owen (INSTAAR University of Colorado)
[6] Discussant

Mason, Owen [144] see Alix, Claire

Massey, David (Indiana University—Bloomington)
[137] *Remote Sensing of Anthropogenic Vegetation in Sierra Sur, Oaxaca, Mexico*

Geospatial technologies, such as remote sensing and LIDAR, have enabled archaeologists to capture high-resolution information about landscapes and settlement patterns thus contextualizing sites through a wider landscape perspective. These tools have also facilitated the detection of otherwise "invisible" archaeological sites through image or spectral analyses and other visualization techniques. This paper examines the performance of vegetation indices for the detection of anthropogenic vegetation from past human-environmental interactions and land use, using freely available satellite imagery of the Sierra Sur in Oaxaca. Concentrations of anthropogenic vegetation can be used as an indicator of past settlement activity in the absence of visible surface remains. Illuminating past activity patterns over wide geographic areas through the remote sensing of vegetation, findings from this paper can advance our methodological approaches to regional survey and mapping of the Sierra Sur.

Masson, Marilyn (University at Albany SUNY)
[5] *Urban Carnivores, Rural Vegetarians? Faunal Discrepancies over Time and Space at Mayapán*

A usually predictable attribute of Postclassic Maya settlements (in Belize and Yucatán) is the abundance of faunal remains relative to preceding Classic Period contexts. This discrepancy is not attributable to taphonomy or bone age, given the recovery of human bone from both periods and the abundance of fauna in even earlier Preclassic deposits. Robust forest environments, balanced human predation levels, and variable animal husbandry practices represent the best explanations for the wealth of Postclassic game. Yet, while urban Mayapán (within the 4.2 km² city wall) boasts dense deposits, peripheral Mayapán (outside the wall) does not, attesting to unequal access to animal resources according to residential zone and occupation. These new results suggest that animals served as more than generic "staples" among the commoner populace at the city and that politico-economic and social factors were at play. While urban conditions generally promote commoner wealth and economic interdependency at the site, farmers' households in the periphery did not experience equitable benefits. In contrast, the scarcity of faunal resources at Terminal Classic households (in Belize and Yucatán) is most probably attributed to environmental or human-ecological stress.

Masson, Marilyn [44] see Bryant, Jeff

Masson-Maclean, Edouard [127] see Britton, Kate

Masur, Lindi (University of Toronto) and Jean-Francois Millaire (University of Western Ontario)
[272] *The Early Intermediate Period Farmer's Almanac: Coproducing Agriculture, Time, and Community on the North Coast of Peru*

Previous research on plant foods and social memory in the Andes has primarily focused on ritual feasting among elite segments of society within the confines of exclusionary monumental spaces. However, it is vital to look beyond elite-directed activities and consider ritualized commoner and quotidian practices as integral to community building and memory making. This paper will demonstrate how domestic food production and consumption, the construction of agricultural landscapes, and wild plant collection in hinterlands are, indeed, also practices which coproduce collective conceptions of time, space, and social identity. Planting, harvesting, collecting, redistribution for tribute, processing, and consumption of plants were intrinsically associated with seasonal cycles and social events experienced by communities as a whole. We integrate paleoethnobotanical and geospatial data from two Early Intermediate Period sites occupied during both the rise and subsequent decline of the Virú polity on the North Coast of Peru. The urban Gallinazo Group site and administrative center Huaca Santa Clara provide interesting case studies for understanding place-making via the liminal spaces between core and hinterland within which agricultural production took place, as well as the social integration of community members through food-centric redistribution economies over several generations.

Matadamas Gómora, Diego (Proyecto Templo Mayor)

[119] The Ometochtli Complex and Its Presence in the Offerings of the Great Temple of Tenochtitlan

In 1971, H. B. Nicholson classified the Mesoamerican pantheon of god's by their symbolic elements and functions. One of the most important groups of this classification is the "Ometochtli Complex," which is exclusively constituted of gods related to the most significant alcoholic beverage in prehispanic Mexico, the octli or pulque. This drink is created through the fermentation of the agave juice. Thus, pulque gods are easily identifiable due to key elements present in their attire. At the archaeological site of Templo Mayor, located in the heart of Mexico-Tenochtitlan, a significant number of excavated offerings includes many recovered artifacts related to the "Ometochtli Complex." Thus, these offerings are associated with the principal imagery located at the edges of Tenochtitlan's main temple. Some of the artifacts recovered in these offerings are connected to pulque and have a particular meaning by their relation to other elements composing the ritual deposit. This paper will show the importance and symbolic attributes represented by the gods of pulque in connection with the two most important Mexica gods: Tláloc and Huitzilopochtli.

Matarazzo, Tiziana [262] see Singer, Zachary

Matchett, Ash A. (InterAmerican University of Puerto Rico)

[289] Ancient DNA Studies in Tropical Environments: A Study into the Genetics of the Precolumbian Indigenous Population of Puerto Rico
Studies into ancient DNA have advanced significantly in the last few years, but these have largely been absent in tropical environments. In the Caribbean, a number of questions still pertain as to the bioarchaeology of the indigenous precolumbian populations and the exact origin of these early inhabitants. Focusing on the skeletal remains of a late Saladoid population from Punta Candelero site (AD 640–1200), three correlated and simultaneous studies have been coordinated with the aim to investigate the archaeogenetics of the site, at the local burial and overall site context. This multidisciplinary investigation, combines the research into the human skeletal material at the endogenous trace human DNA and the microbial DNA. Complimenting this study is the genetic research into faunal remains of companion dog burials of earlier cultural inhabitants. Procedures were conducted in a dedicated laboratory facility and concentrated on maternal inheritance (mtDNA) and microbial 16S rRNA typing, although extended genetic studies have been conducted in particular well preserved samples. The results, impact and significance of these studies to our understanding of the early peopling of the Caribbean, their well-being, life and origin will be presented. In addition, discussion on preliminary whole genome research, aspects and implications.

Matchett, Ash A. [156] see Roman Buso, Gabriela

Matheny, Deanne [229] see Nielsen-Grimm, Glenna

Mather, David (Minnesota Historical Society)**[385] "Dear, Honored Guest": Archaeological Models of Bear Ceremonialism in Minnesota**

Archaeological expressions of bear ceremonialism in Minnesota include: ritual sites with dozens to hundreds of bear skulls, calcined fragments of burned bear paws, effigy earthworks, rock art and portable art. These were created by Siouan and Algonquian speaking peoples, including the Dakota and Ojibwe, who are still resident in the state. Some finds relate to the bear hunt, feast and funeral that are the focus of A. Irving Hallowell's (1926) concept of bear ceremonialism. Others appear to represent rituals that are not documented in the ethnographic literature. Modeling, or connecting archaeological data with abstract theories, is used here to explore and interpret possible practices of bear ceremonialism in the state. Data sources include accounts of Minnesota bear ceremonialism from tribal elders and cultural anthropologists, archaeological contexts, artifacts and zooarchaeological analyses, and bear biology including comparative measurements of modern bear teeth of known age/sex to compare with archaeological materials. Resulting models include the concepts of bear graves and secondary burials, and seasonal connections between different types of rituals practiced by related groups, within and beyond the scope of Hallowell's bear ceremonialism.

Mathers, Clay (Coronado Institute)**[395] War and Peace in the Sixteenth-Century Southwest: Objected-Oriented Approaches to Native-European Encounters and Trajectories**

Although conflict and conquista campaigns characterized many of the earliest encounters between Native and European groups in New Spain and La Florida, the transformation of objects, communities, and strategic policies in these areas was locally variable and changed dramatically by the close of the sixteenth century. Materials characteristic of these changes and variegated responses are found widely in the archaeological record of the American Southwest, but have seldom been explored for the insights they provide into broader anthropological themes such as resistance, exchange, and agency. While this study focuses on the fine-grained, contextual analysis of objects, its broader goal is to compare cultural trajectories at the regional and interregional scales, particularly the congruence and contrasts between the American Southwest and Southeast in the first century of New-Old World contact. Both areas transitioned from initial imperial strategies of acquisition and conflict, to policies of settlement and missionization by the end of the 1600s, and in both areas a similar suite of European objects was available. Nevertheless, the manner in which these objects were employed by Natives and Europeans varies significantly and in ways that reveal to us important aspects of the earliest Colonial encounters in North America.

Mathews, Darcy (University of Victoria), Joan Morris (Songhees Nation) and Reona Oda (University of Victoria)

[77] Relatives of the Deep: Situated Knowledge and Archaeological Remote Sensing to Assess Climate Change Vulnerability at Tl'ches
Sellemah/Joan Morris, a Coast Salish Nation elder, was raised at Tl'ches, an archipelago of low islands in the Salish Sea of southwestern British Columbia. Islands are familial places in the Coast Salish world, the word translating to "relatives or ancestors of the deep." Ongoing archaeological and ethnoecological research indicates this island ecosystem was shaped by millennia of resource management and subsistence practices. In 1957, a drinking water shortage forced residents to move to Vancouver Island—a move with disastrous implications for Sellemah and her family. Today, global climate change is threatening to impact the island chain at a time when Coast Salish peoples are returning to this ancestral cultural keystone place. To understand both the deep history of Coast Salish ecological management, and their future use of Tl'ches, we are using drone imaging to inventory intertidal archaeological and ecological features. Lidar digital elevation models are also used to map near-future sea level tidal heights associated with global climate change. Results indicate village sites and intertidal habitats will be profoundly affected by projected sea level change, necessitating the development of novel management regimes.

Mathews, Darcy [49] see Holmes, Keith

Mathews, Jennifer (Trinity University), John Gust (University of California, Riverside) and Scott Fedick (University of California, Riverside)

[280] Twenty Years of Historical Archaeology in the Yalahau and Costa Escondida Regions

Since the mid-1990s, members of the Yalahau and Costa Escondida projects have focused on historical archaeology in northern Quintana Roo. Our research has examined the remnants of the chicle (chewing gum), sugar cane and small-batch rum industries from the late 1800s. Although these sites are relatively recent, the production equipment and other artifacts have been picked through by later occupants, making it challenging to be able to reconstruct the historic record. In an attempt to overcome this obstacle, we have combined on the ground archaeology, with archival research and ethnographic interviews with local peoples as well as experts in commodity production. Through these combined methods, we have attempted to better understand the living and working conditions of Maya laborers, their foreign managers, as well as the production process for making chicle and rum in this remote region.

Mathiak, Brigitte [210] see Lenssen-Erz, Tilman

Mathien, Joan [23] see Melgar, Emiliano

Mathwich, Nicole (University of Arizona) and Barnet Pavao-Zuckerman (University of Maryland)

[285] *Bureaucratic Reforms on the Frontier: Zooarchaeological and Historical Perspectives on the 1767 Jesuit Expulsion in the Pimeria Alta*
The introduction of livestock to the Pimeria Alta (northern Sonora and southern Arizona), was one prong of Spanish imperial expansion into North America initiated largely by Jesuit missionization. Unlike other areas of North America, the missions in this region experienced an enormous bureaucratic transition following the expulsion of the Jesuits in 1767, and the subsequent arrival of Franciscan missionaries. Historians and historical anthropologists debate the social and economic impacts of this transition, but archaeological evidence has not been brought to bear on the issue or its consequences on the local landscape. This paper evaluates the ability of zooarchaeological, historical, and isotopic data to ascertain the impact of the bureaucratic shift on the landscapes of the Sonoran Desert. Animals like cattle, sheep, and goats have the ability to alter landscapes through grazing, and the stocking rates of these animals at the missions were linked to the relative stability and administration of a mission site. This paper examines range management strategies, and culling and butchering practices prior to and after the expulsion, and presents an archaeological framework for studying the shift in political ecologies in the region following the change in religious bureaucracy throughout the Spanish empire.

Matisoo-Smith, Lisa (University of Otago), Karen Greig (University of Otago), Katrina West (Curtin University) and Anna Gosling (University of Chicago)

[340] *The Commensal Animals in the Pacific: What Might DNA Results Suggest About the Animal-Human Relationships through Time?*
For the last 20 years we have been studying modern and ancient DNA of the various commensal animals in the Pacific. Different patterns of distribution and genetic variation exist and may provide information regarding the animal-human relationships and the role these animals played in the various Pacific cultures through time.

Matisoo-Smith, Elizabeth [181] see Greig, Karen

Matos, Eduardo (Arqueólogo)

[225] *Discussant*

Matson, R.G. (University of British Columbia) and William Lipe (Washington State University)

[142] *Why Raise Turkeys in the Mesa Verde Region?*

Lipe et al. (2017) present estimates of the costs of raising maize fed turkeys. Raising a turkey required approximately one-third as much maize as a Puebloan ate in a year. Here we present the probable reason for engaging in this costly behavior. Pueblo III Mesa Verdeans had a diet heavily dependent on maize and short on other protein sources. Most importantly, it was short on two essential amino acids, lysine and tryptophan. We begin by reconstructing the height and weight of Pueblo III Mesa Verdeans from their remains. We then produce estimates of calories consumed and compare this with the amount of calories and proteins provided by maize. Well-supported evidence indicates that 80% of both requirements came from maize. The amounts of lysine and tryptophan provided, however, are insufficient and beans and animal protein are the only constituents of Pueblo III coprolites with significant amounts of these amino acids. Yet the same evidence indicates that the amount of beans alone is inadequate and only small amounts of wild animal protein was consumed. In such a setting raising turkeys has obvious benefits.

[142] *Chair*

Matson, R.G. [368] see Ellyson, Laura

Matson, R.G. [142] see Lipe, William

Matsumoto, Mallory E. (Brown University)

[391] *Molding and Stamping Hieroglyphs on Maya Ceramics*

This paper examines the implications of mold-made ceramic texts for understanding Maya scribal practice and script ideology. Most studies of hieroglyphs on ancient Maya ceramics have focused on painted and incised vessels whose glyphic and iconographic contents were made by hand on an individual basis and often with a particular consumer in mind. In contrast, the molded texts addressed here consist of pre-formed hieroglyphs that were integrated into the vessel body itself, either by shaping all or part of the ceramic in a hard mold or by applying a stamp to its leather-hard surface. Previous theoretical work on reprographics suggest that written technologies can significantly influence the development of literary and intellectual culture, literary practice, ideologies of writing (e.g., Anderson 2001; De Weerd 2011; Egan 2011; Eisenstein 1980). Furthermore, molded ceramic texts differ linguistically in manifesting fewer specific references to either the vessel or its user(s), more variability in content, and a more restricted temporal and spatial distribution than those with painted glyphs. More detailed study of this ceramic corpus promises to enhance our understanding of the relationship between the hieroglyphic script, writing technologies, and those who produced and interaction with the ceramic texts.

[391] *Chair*

Matsumoto, Mallory E. [369] see Roche Recinos, Alejandra

Matthews, Wendy
[275] *Chair*

Matthews, Wendy [275] see Portillo, Marta

Matthiesen, Henning [224] see Harmsen, Hans

Mattson, Hannah (University of New Mexico)

[379] *Beads, Myth, and Ritual Practice: Tracing Traditions of Ornament Use in Ceremonial Deposition and Costuming in the Northern U.S. Southwest*

As early as the sixteenth century, Spanish explorers noted the abundance of turquoise and shell jewelry adorning the Pueblo residents of the Rio Grande Valley and southern Colorado Plateau. In addition to serving as aesthetically pleasing objects of bodily decoration, these ornaments figure prominently in Pueblo creation and migration stories and are vital to the performance of various ritual practices, including ceremonial dances and the making of offerings and prayers. Archaeological research reveals that some of these ornament traditions extend back over one thousand years to the earliest intensive agricultural occupations of the northern prehispanic Southwest, around AD 500 to 700. Continuities in the use of specific ornament materials and forms, particularly in ritual contexts, has implications for the persistence of certain ideological elements across time despite several episodes of dramatic population reorganization.

[379] *Chair*

Matulek, Hannah (College of Wooster) and Paul Nick Kardulias (College of Wooster)

[232] *An Examination of Ancestry: Exploring the Peopling of the Americas through Paleoindian Cranial Indices in Comparison with the Howells Collection*

The original peopling of the Americas has puzzled researchers for decades. While some evidence points to a single wave of migration, still other data suggest two or more waves. Their reasonable estimated arrival dates range from 14,500 to over 20,000 BP, although some scholars push back their arrival even farther. Drawing from archaeology, genetics, historical linguistics, and physical anthropology, the peopling of the Americas debate encompasses research from a wide range of experts. In this study, craniometric data are examined by means of the cranial index, defined as the ratio calculated by multiplying the maximum width (XCB) of the head by 100, then dividing by the maximum length of the head (GOL). Cranial indices are known to vary between different regions of the world, suggesting that different ratios represent different geographic origins of peoples. I examine cranial indices from 12 individuals dating from the Terminal Pleistocene to the Early Holocene found throughout the Americas. These indices are then statistically compared to the 2,524 indices from 28 populations examined in the Howells Craniometric Data Set using t-tests. Results of this test suggest morphological affinities between certain ancient and modern groups, offering insight into possible links between the two populations.

Matute, Varinia (University of Calgary), Mary Jane Acuña (Washington University of Saint Louis), Francisco Castañeda (Universidad de San Carlos de Guatemala) and Boris Beltran (Universidad de San Carlos de Guatemala)

[337] *Results of Recent Investigations at El Tintal, Petén, Guatemala*

El Tintal, located in northern Petén, is part of a group of ancient Maya cities that emerged during the Preclassic period in the central karstic uplands. The El Tintal Archaeological Project is interested in understanding the historical development of the population that inhabited the settlement from the beginning to its abandonment. This paper will focus on the results of our recent investigations at El Tintal that yield information on the origins of the city and its regional interactions, aimed at contributing to the understanding of the complex sociocultural processes that shaped ancient Maya history.

Matute, Varinia [131] see Acuña, Mary Jane

Mauldin, Raymond (UT San Antonio), Emily McCuistion (Texas State University), Leonard Kemp (UT San Antonio) and Cynthia Munoz (UT San Antonio)

[345] *Exploring Occupation Patterns in the Lower Pecos and Central Texas Regions over the Last 9,000 Years Using Radiocarbon Dates*

We use summed probability distributions derived from radiocarbon sequences as a gross measure of prehistoric occupation patterns for two regions in Texas. The first sequence consists of over 325 dates from the Lower Pecos Region, located along the Rio Grande and Pecos Rivers. The region has over 40 years of radiocarbon dating, with dates in this database coming from multiple excavation projects that were frequently focused on shelters and cave. The second dataset comes from the Upper San Antonio River area in Central Texas and reflects projects conducted since the late 1970s. This set has roughly 320 dates, with all dates coming from open sites. Focusing on the last 9,000 years, we compare the two regional sequences. Using the same calibration procedure, we isolate a series of differences in these distributions that do not seem to be adequately explained by sample bias (i.e., AMS versus conventional samples) or taphonomic processes related to different recovery contexts. While research is ongoing, these sequences may track regional hunter-gatherer occupation patterns, with differences providing opportunities to explore the impacts of other variables (e.g., climate/ecological shifts, disease) on each region.

Mauldin, Raymond [344] see Hard, Robert

Mauricio, Ana (Pontificia Universidad Católica del Perú)

[170] *Reevaluating the End of the Early Intermediate Period on the Peruvian Coast from the Perspective of the Lima Culture*

El fin del Periodo Intermedio Temprano en la arqueología peruana ha sido cronológicamente ubicado alrededor del 600 AD y culturalmente es representado por el final de culturas costeñas como Moche, Lima y Nasca. Alrededor del 600 AD hay evidencia de un evento extraordinariamente fuerte de El Niño, el cual ha sido registrado en sitios arqueológicos desde Piura hasta Lima. Este evento (o eventos), fue anteriormente interpretado como una importante causal de la caída de estas culturas costeñas, sin embargo, investigaciones más recientes, llevadas a cabo en diferentes partes de la costa peruana, vienen demostrando que los Moche, Lima y Nasca no se “extinguieron” en el 600 AD sino que siguieron existiendo hasta alrededor del 800–850 AD. No obstante, las características que presentan estas culturas costeñas después del 600 AD indican importantes transformaciones culturales y económicas que fueron implementadas por estas sociedades, en parte como respuesta a un escenario climático particular. Esta presentación analiza este escenario desde la perspectiva de la cultura Lima, en la costa central del Perú y propone la reconsideración cronológica para el fin del Periodo Intermedio Temprano.

[170] Chair

Mavuso, Silindokuhle [87] see Warren, Shannon

Maxwell, Ashley (University of South Florida), Robert H. Tykot (University of South Florida) and Andrea Vianello (Independent Researcher)
[290] *The Langobards in Italy: A Bioarchaeological Analysis of the Seventh-Century AD Necropolis of Sovizzo in Vicenza, Italy*

The Romans and Byzantines in Veneto (northeast Italy), experienced invasions from a Germanic tribal group, the Langobards, in AD 567, with occupations lasting until the eighth century AD; however, Langobard diet and health are largely unknown during this period of transition. Information on Langobard diet and health is pertinent to understanding the political, economic, and social changes that occurred during the Langobard arrival and subsequent occupation. To address these questions, we focused on the seventh-century site of Sovizzo, an early medieval Langobard occupation located west of Vicenza. Sovizzo is an important case study because its location allowed the Langobards to secure large areas of farmland far from river systems that were used for Byzantine military communications. Excavations from 1985 recovered 175 individuals from earthen pits with grave goods indicative of social status (knives, bone combs, ceramics, and belt buckles). Of these, 50 adult individuals (25 males/25 females) were chosen for paleopathological and isotope analyses. Cribra orbitalia, dental pathologies, and trauma were recorded in the selected sample, with high rates of dental attrition, caries, dental calculus, and linear enamel hypoplasia's suggesting a diet high in carbohydrates with hard fibrous foods. This was followed by isotopic and elemental analyses.

Maxwell, David (Simon Fraser University)

[191] *Refining the Early Chronology: North American Beer Cans 1935–1967*

Beer cans have now been in use in North America since 1935, meaning that sites containing early beer cans have the potential for eligibility for protection in certain jurisdictions, such as California (where the California Environmental Quality Act requires the evaluation of materials greater than 50 years of age). This presentation will serve to clarify distinctive characteristics of beer cans produced prior to 1967, the current 50-year-old mark.

Maxwell, John [49] see Duelks, Jonathan

May, Hila (Dep. of Anatomy and Anthropology, Dan David Center, Sackler Faculty of Medicine), Bruce Latimer (Departments of Anatomy and Orthodontics, Case West), Omry Barzilai (Israel Antiquities Authority, Jerusalem, Israel), Ofer Marder (Archaeology Division, Ben-Gurion University of the) and Israel Hershkovitz (Department of Anatomy and Anthropology, Sackler Fa)
[338] *Manot 1 Calvaria and Aduma Skull: Are They the Same?*

The Manot 1 calvaria demonstrates a mosaic of “archaic” and modern traits. Although the taxonomic significance of this combination of features is not clear, a similar combination of archaic and modern features exists in the fossil record across sub-Saharan African and the Middle East until after 35 kya. The aim of the current study is to examine the possibility that the Aduma skull, Ethiopia (60–90 kya) is the mother population that gave rise to the Manot Cave hominins. This was carried out by comparing the Manot calvaria size, shape and morphological features to that of the Aduma skull.

May, Hila [338] see Hershkovitz, Israel

Maynard, Corbin [260] see Graesch, Anthony

Mazzariello, Joseph C. [171] see Harrower, Michael

Mazzucato, Camilla (Stanford University)

[73] *Weaving the Fabric of Society at Çatalhöyük: A Socio-Material Network Approach to the Study of Early Agricultural Settled Life, Social Structure, and Differentiation*

The end of the Çatalhöyük Research Project's (ÇRP) 25-year mandate and the consequent generation of large and unique datasets produced by the collaboration of excavators and the specialists labs provide an extraordinary opportunity to investigate patterns of early agricultural settled life, social structure and differentiation at an intrasite level through a synthetic approach capable of weaving together different data threads. In this study, a relational framework rooted in models of socio-material interdependencies is used to link the various ÇRP datasets (e.g., architecture, pottery, botanical remains, chipped and ground stone) and produce complex formal network models. Relational approaches are built on the observation that, instead of focusing on entities in isolation, analyzing the connections or the set of relations between them provides a much deeper understanding of the dynamics of social phenomena and in recent years have been increasingly recognized as a valuable methodological framework for investigating social linkages at Neolithic Çatalhöyük. Socio-material archaeological networks are used here as a way of mapping the cross-cutting and overlapping set of “flexible networks” that form the site's social fabric. This methodology provides a way of elucidating social dynamics both synchronically and diachronically.

McCollum, William [75] see Talaverano Sanchez, Arlen Mildred

McAnany, Patricia (University of North Carolina, Chapel Hill)

[76] *Discussant*

McAnany, Patricia [36] see Dedrick, Maia

McBride, Kevin [223] see Leslie, David

McCafferty, Geoffrey (University of Calgary)

[379] *Costume and Identity in Pacific Nicaragua*

Sixteen years of archaeological research along the shore of Lake Cocibolca in Pacific Nicaragua has yielded a wealth of material culture relating to domestic practice and mortuary rituals for the period from AD 500 to 1250. Among these are numerous objects of adornment, such as pendants, beads, and ear ornaments. Additional costume information is found on small ceramic figurines, primarily of females with painted decoration indicating clothing, hairstyle, tattooing, and jewelry. Based on initial research we presented on the construction of identity from the Santa Isabel site. Now with another five years of excavation we are able to add new information from the sites of El Rayo and Sonzapote to contrast these contemporary sites to discuss regional variations in concepts of the "body beautiful." Furthermore, changing styles from the late Bagaces (AD 500–800) to Sapoa (AD 800–1250) periods allows evaluation of ethnohistorical claims for ethnogenesis with the arrival of "foreign" groups with possible Mesoamerican origins.

[209] *Discussant*

[326] *Chair*

McCafferty, Geoffrey [9] see Richey, Kate

McCafferty, Sharisse (University of Calgary) and Geoffrey McCafferty (University of Calgary)

[209] *Fringe Identities: Costume in the Mixtec Codices*

The Mixtec codices depict costumes from Postclassic Oaxaca, including clothing, face paint, hairstyles, footwear, and jewelry. Contextualized in religious, military, and other social rituals, costume played an important role in framing the action as well as representing individuals in a variety of social identities. This paper focuses on styles and patterns of clothing as they were used to characterize gender, status, ethnicity, occupation, and religious and political roles. Specifically, we examine the extent to which costume communicates different aspects of social identity.

McCall, Ashley

[290] *Great Hungarian Plain Diet and Mobility through the Neolithic, Copper Age, Bronze Age, and Iron Age*

The Great Hungarian Plain (GHP), which occupies part of Hungary and five surrounding countries, was a gateway to population influx and cultural admixture along the Eastern Steppe corridor. The GHP was a hub of cultural change, including a shift in settlement patterns, during the transition between the Neolithic and Copper Age and again during the Bronze and Iron Ages. This research uses stable isotope analyses to examine transformations in the GHP area and how these changes evolved over the course of a few thousand years. Isotopic analysis will provide evidence for subsistence strategies (carbon and nitrogen), answering questions about general diet and changes to diet through time. This approach will also provide data on the possible regions of cultural influence due to migration through the use of strontium isotopes. The isotopic data will help elucidate potential cultural dispersal patterns and the rate at which this occurred. Furthermore, the isotopic data will also help identify potential cultural evolution patterns and the rate at which this would have occurred.

McCall, Grant (Tulane University), Theodore Marks (University of Iowa), Andrew Schroll (Tulane University) and Jordan Krummel (University of Arizona)

[210] *Putting Southern African Rock Paintings in Context: The View from the Mirabib Rockshelter, Namibia*

Various researchers have made great strides toward understanding southern African rock art through the exploration of the ethnographic and ethnohistoric records of San hunter-gatherer shamanism. In contrast, less attention has been paid to the archaeological context of the Later Stone Age (LSA) in which rock art was produced. This paper examines Middle Holocene rock paintings at the Mirabib rockshelter in the Central Namib Desert, western Namibia. Our fieldwork at Mirabib and our reanalysis of materials recovered during previous excavations present a striking picture of LSA foraging activities in this harsh desert environment. On the one hand, much of the archaeological record at Mirabib apparently relates to attempts at coping with extreme aridity at a site with no reliable water sources. On the other hand, the rock art imagery at Mirabib would seem to reflect a concern for rainmaking. Synthesizing this evidence, we offer some ideas about the role of the rock art production at Mirabib in the social systems of the hunter-gatherers who used the site. We argue that rock art was not passive wall decoration but was rather an instrumental part of social rituals aimed at the management of tensions arising among populations under stress.

[314] *Discussant*

McCall, Grant [54] see Marks, Theodore

McCarty, Sue Ann (University of Virginia)

[356] *Inter-Household Ceramic Motif Variation and its Implications for Halaf Social Inequality at Kazane Hoyuk, Southeast Turkey*

Intersite motif variability is understudied in a systematic way to understand the complicated design vocabularies, paint colors, textures and vessel forms of ceramics from the Halaf cultural horizon (5900–5350 cal. BCE/5200–4500 uncal. BCE), a culture-historical entity in the Late Pottery Neolithic of Upper Mesopotamia (southeastern Turkey, northern Syria and northern Iraq). Together, these motifs create an almost music-like multidimensional symphony of pattern including naturalistic figures that speak to the Late Neolithic political economy. At the largest known Halaf site—Kazane Hoyuk outside modern Sanliurfa, Turkey, inter-household ceramic variability was studied in order to determine if the famously rich painted motifs on vessels show signs of clustering in association with interior and exterior household spaces and, if so, what that motif distribution means in the context of social organization at the site. This is particularly relevant because social organization remains deeply enigmatic in the Late Neolithic; vessels that may have been associated with public feasting shed light on Halaf inequality and symbolic systems.

McCauley, Brea (Simon Fraser University) and Mark Collard (Human Evolutionary Studies Program and Department)

[287] *A Test of Competing Hypotheses Concerning the Impact of Demography on Cultural Evolution*

Recently there has been a surge of interest in the possibility that demography affects cultural evolution. Some authors have proposed that population size affects the appearance and retention of innovations and therefore influences the complexity of a population's cultural repertoire. Others have averred that it is not population size that drives cultural complexity but rather population pressure (the ratio of population density to the density of available resources). Still others have argued that population size may only have an indirect impact on cultural complexity. According to these authors, larger societies tend to have more specialization of tasks than smaller ones. Task specialization has the potential to affect the complexity of a population's cultural repertoire because individuals need not master all skills and can focus on learning a small number of more complex tasks. Here, we report a study designed to test among these hypotheses. We obtained from the literature data on technological complexity for a sample of small-scale societies. These data were combined with data for a number of independent and control variables. Subsequently, we used partial regression analysis and multiple regression to test the predictions of the three hypotheses. Our results do not support the hypotheses equally well.

McCleary, Alexandra (University of California, Berkeley)

[366] Land Use and Site Formation Processes of a Genízaro Land Grant: Recent Excavations at the Pueblo de Abiquiu, New Mexico

This paper will discuss the most recent excavations in the Genízaro Pueblo de Abiquiu, NM (est. 1754). Abiquiu, as one of the oldest and most successful Genízaro land grants, is a key area for better understanding the history and trajectory of Indo-Hispanic settlements in Northern New Mexico. Three distinct areas within the historical boundary of the land grant were excavated, representing domestic, defensive, and agricultural contexts. The paper will go over the excavations, ground-truthing GPR results, and highlight the ongoing collaborative process that has made this excavation a success.

McClung de Tapia, Emily (IIA-UNAM Mexico)

[388] Domesticated Huauhtzontli (*Chenopodium berlandieri* Moq. ssp. *nuttalliae* [Safford] Wilson and Heiser) in Prehispanic and Modern Mexico
Huauhtzontli, a cultivated chenopod widely distributed in the central highlands of Mexico, is generally believed to have been domesticated in prehispanic times. However, neither the timing nor the area of domestication has been clearly established. Morphometric analyses of modern fruits of the central Mexican subspecies of *Chenopodium berlandieri* and revision of archaeological specimens recovered from various excavations in the region suggest that domesticated fruits were not predominant, possibly until the end of the Late Preclassic period or later. Currently available evidence for archaeological remains of *Chenopodium* from the Teotihuacán Valley, Xaltocan, and San Gregorio Atlapulco are discussed. Modern culinary traditions and their possible prehispanic counterparts are considered.

[174] Discussant

McClung de Tapia, Emily [13] see Acosta-Ochoa, Guillermo

McClure, Sean [80] see Reilly, Frank

McConnel, Sean [350] see Monaco-Schlater, Joanna

McCool, Weston (University of California at Santa Barbara)

[230] Coping with Conflict: Defensive Strategies and Chronic Warfare in the Prehispanic Nasca Region

Warfare was a significant sociopolitical practice throughout the Andes during the Late Intermediate Period (AD 1000–1450). A salient research topic within broader investigations of conflict is how populations cope with chronic warfare. This article utilizes statistical and GIS-based analyses of architectural features and settlement patterns to reconstruct defensive coping mechanisms among fortified settlements in the Southern Nasca region of Peru. Specifically, this research evaluates how populations deployed artificial defenses (fortifications), natural defensibility, and settlement placement to best protect themselves and critical resources from enemy incursions. Results demonstrate that slope was the most significant factor guiding the construction of intrasite fortifications. Patterns in intersite fortification were primarily driven by population size, whereby the smallest most vulnerable settlements constructed significantly more fortification features. Settlement patterns show that natural defensibility, large viewsheds, and proximity to economic resources dictated the selection of occupation locations. This research demonstrates that LIP populations made optimal trade-offs between competing defensive variables, revealing a pattern of complex and coordinated decisions directed toward regional defensive strategies.

McCormick, David (Yale University)

[218] The Obsidian Workshops at Late Classic Cotzumalguapa: Preliminary Technological and Sourcing Analyses

Scholarly understanding of the prehistoric economy of the Pacific Coast lacks the resolution afforded its Lowland counterpart. Analysis of the Obsidian deposits at Cotzumalguapa offer us a lens through which to bring our understanding of the prehistoric economy of the Pacific Coast into focus. Surface survey and excavations near the El Baúl acropolis revealed the presence of several obsidian dumps, the result of a large-scale lithic industry in the Classic Period site of Cotzumalguapa. Thus far, the debitage analyzed is almost entirely the result of prismatic blade cores reduction. Interestingly, however, neither nodules, nor decortication flakes, or even first series flakes and blades have been identified. Cores also occur in low frequencies and extant cores are nearly exhausted. These patterns suggest that obsidian was imported in the form of already reduced prismatic-blade cores as opposed to rough polyhedral cores or nodules. Preliminary visual analysis suggests the vast majority of the material from this deposit came from the Guatemalan Highland sources of El Chayal and San Martín Jilotepeque. Although the debitage analyzed to date suggest blade production was the primary activity in the El Baúl group, there is also evidence of low intensity, projectile-point production.

McCrackan, Jennifer and Eric Weaver

[301] Caves of the Badlands: A Geospatial Analysis of Cave Archaeology at El Malpais National Monument

The El Malpais National Monument located roughly 100 miles west of Albuquerque, New Mexico, borders the southern part of the San Juan Basin and the southeastern portion of the Colorado Plateau. The extensive geologic history of volcanic activity has created a seemingly hellish volcanic field rightfully named “the badlands” by Spanish explorers. However, the region is in fact home to a rich cultural history that heavily utilizes the natural environment, including its many cave systems. The lava flows themselves contain vast ancient trail systems that are poorly understood at present and have only recently become a topic of research. In the summer of 2016, locational data and assessment reports concerning the park’s over 400 recorded subterranean features were collected in order to produce a geospatial distribution map of those with archaeological significance. A preliminary examination of the distribution in relation to the park as a whole, as well as site comparisons by type and location are presented. This data will then be compared with prehistoric trail data collected from past archaeological surveys to assess a possible relationship between the caves and the trails.

McCray, Brian (Vanderbilt University)

[222] Open Space and Restricted Action: Analysis of Intrasite Networks of Movement at Wimba, in the Northeastern Peruvian Montane Forest

In an area that has been considered marginal both geographically and in the narrative of South American prehistory, new research shows extensive settlement, landscape modification, and interaction between inhabitants of the eastern slopes of the Andes and their neighbors. The site of Wimba, located in the Amazonas department, in the northeastern Peruvian montaña—the tropical montane forest between the highland Andes and lowland Amazonian rainforest—is one of the best known archaeological sites located at the eastern edge of the Late Intermediate Period (ca. 900–1500 CE) Chachapoyas cultural region. New data collected by the Proyecto Arqueológico Wimba in 2016 sheds light on the site’s construction, duration of occupation, use, and abandonment. Through network analysis of architecture, ceramics, and lithics recovered from both open spaces and structures, this paper will examine how the built environment of Wimba structured movement, ritual, and politics. The paper will also consider the structure of movement throughout the region by comparing Wimba with nearby neighbors. These data reflect the role of Wimba’s inhabitants in local, regional, and interregional sociopolitical organization and intra- and/or interregional networks of interaction, roles that created and enacted a society that evades broad categorization as Amazonian or Andean.

[222] Chair

McCuiston, Emily [345] see Mauldin, Raymond

McCurdy, Leah (University of Texas at San Antonio)

[236] *Solid Foundations: Practical and Symbolic Significance of Bedrock at El Castillo Acropolis of Xunantunich, Belize, in the Maya Central Lowlands*

Not all excavations reach to bedrock. In the Maya Central Lowlands, exposing bedrock can be difficult due to the longevity of occupational sequences and the sometimes confounding presence of thick, seemingly endless Preclassic marl floors. In some cases, our ability to reach and examine bedrock helps us to consider early living and ceremonial spaces, masonry and structural techniques, as well as potential emic connections of natural limestone mountains and cultural manifestations of limestone temples. At the site of Xunantunich, Belize, we have evidence to support each of these considerations. In this paper, I focus on our findings of deliberately exposed bedrock during at least one building phase of El Castillo acropolis. I propose that the juxtaposition of exposed bedrock with a newly renovated temple structure above it, including an elaborate stucco frieze proclaiming divine and kingly prominence in the region, springs from the interconnectedness of the natural and built environments (as we distinguish them today) in the Maya worldview. The linkages of nature/culture in this example likely relate to messages of power and expressions of cosmology. Broadly, this case study resonates with cross-cultural questions about how humans conceptualize, interface with, and modify their surroundings.

[236] Chair

McCurdy, Leah [7] see Batty, Sylvia

McCutcheon, Patrick [86] see Brown, James

McDonough, Heather (Western State Colorado University), Zachary Hall (Western State Colorado University) and David M. Hyde (Western State Colorado University)

[7] *A Method for Identifying Surface Scatters in the Jungles of Belize: A Case Study from the Medicinal Trail Community*

The implementation of systematic surface collection on a grid within Operation 17 at the Medicinal Trail Community in northwestern Belize highlights the importance of surface collection to the fuller understanding of ancient Maya socioeconomics. Surface survey and collection at archaeological sites can lead to more precise interpretation of a site. However, jungle debris is often cleared from Maya sites with rakes, disrupting any surface collection before excavations begin. At Operation 17, care was taken not to disturb surface artifacts before excavation. Survey of surface scatter and further excavation of four of these units revealed that the surface and subsurface artifact concentrations were quite different. This poster looks further into the method of surface collection, and the kinds of information which can be learned from utilizing this method.

McElhoes, Jennifer (California State University Long Beach) and Carl Lipo (Binghamton University)

[300] *Spatial, Technological, and Functional Characteristics of Ceramics along the Southern California Coast*

Prehistoric ceramics found across southern California have a discrete spatial distribution. While locally manufactured ceramics are common to the south and southeast of the Los Angeles River, prehistoric ceramic sherds are rare in deposits located to the northwest. This marked distribution is potentially explained through a few hypotheses. Populations to the north may have had access to resources necessary for pottery alternatives or may have differed in their settlement patterns, mobility, and/or subsistence practices. Alternatively, it is possible that ceramics are associated with distinct population histories and that the south is occupied with populations that are derived from the California desert. In this poster, I evaluate measurements of technological and functional variability of ceramic assemblages from deposits across coastal southern California to determine the degree of variation that exists in the use and production methods of vessel ceramics. After ruling out differences in surface age and deposition, if aspects of the environment are correlated with space, it is likely that vessel ceramics are tied to an ecological or economic feature of the environment. Alternatively, random variability across space potentially supports the hypothesis that population histories are largely driving the presence of pottery.

McGill, Kendall

[301] *Investigating Cedar Mesa (Utah) Settlement Pattern Behaviors Using Ideal-Free Distribution*

Ideal-Free Distribution (IFD), a behavioral ecology theory, has been increasingly adopted by archaeologists to address questions about the relationship between settlement distribution, environment, and economy. In an anisotropic environment like Cedar Mesa, IFD theorizes that individuals would arrange themselves across the landscape according to habitat suitability and occupy the highest ranked regions first to maximize benefit to the individual. The Ancestral Pueblo of Cedar Mesa subsisted on a maize-based diet and it has long since been assumed their dietary reliance on dry-farmed maize yields resulted in residence location selection driven by access to agriculturally productive land. Analyzing archaeological site data and digital environmental datasets with IFD provided an opportunity to reexamine the settlement patterns of the Ancestral Pueblo on Cedar Mesa and the potential influence of additional environmental variables. In addition to proximity to arable lands, IFD predicts that occupants would select residential locations that reduced transportation costs to essential resources, such as water, wild foods, and fuel. This presentation shows the results of habitat suitability calculations and assesses the degree to which IFD predictions align with settlement pattern behaviors on Cedar Mesa.

McGillivray, Tegan [333] see Carter, Alison K.

McGovern, Thomas H.

[224] *Responding to Burning Libraries*

Rising sea levels, increasing storminess, melting glaciers, rising soil temperatures, and increased wildfires are all increasingly affecting archaeological sites worldwide. Accelerated destruction of sites with organic preservation poses a dual threat to global and local cultural heritage and to archaeological evidence that is becoming recognized as key global change data. As archaeologists increasingly participate in local, national, and international efforts to promote genuine long term sustainability we also recognize that our "distributed observing network of the past" is rapidly being destroyed by accelerated environmental change. Many local responses to these challenges are being mounted by archaeologists and host communities, but there is an urgent need for coordination and collaboration on a wider scale to share resources, pool expertise, and identify and disseminate best practice. The threat posed to both heritage and science provides an opportunity for enhanced cooperation among resource managers and local residents as well as for outreach to the wider public. This session is sponsored by the SAA Climate Change Strategies and the Archaeological Record Committee and by the IHOPE

Threats to Heritage and the Distributed Observing Network of the Past team (<http://ihopenet.org/global-environmental-change-threats-to-heritage-and-long-term-observing-networks-of-the-past/>). We welcome new members and allies.

[224] Chair

McGovern, Thomas H. [32] see Dugmore, Andrew

McGrath, James (University of Iowa), Rebekah Truhan (University of Iowa), Adam Skibbe (University of Iowa) and James Enloe (University of Iowa)

[342] *The Sky Is Falling: Site Formation Processes at Woodpecker Cave, Johnson County, Iowa*

Woodpecker Cave is a small, limestone rockshelter occurring on a drainage of the Coralville Reservoir in Johnson County, Iowa. The site was originally excavated in 1956 by Warren Caldwell and has been the home of the University of Iowa archaeological field school from 2012 to 2016. The University of Iowa excavations identified Late and Terminal Woodland materials with a high concentration of roofspall contributing to the archaeological deposits. When combined with recent terrestrial LIDAR scans of the rockshelter, the roofspall data provide insights into the site formation processes occurring at Woodpecker Cave. Roofspall morphology and the fabric of the archaeological deposits are the focus here to better understand how active formation processes occurring within the rockshelter have influenced the human occupations of the site.

McGrath, James [54] see Marks, Theodore

McGrath, Krista (BioArCh, University of York), Keri Rowsell (BioArCh, University of York), Christian Gates St-Pierre (Université de Montréal) and Matthew Collins (BioArCh, University of York)

[85] *Buck-ing the Trend: Surprising Species Identifications of Archaeological Bone Points Using Zooms in Deer-Dominated Faunal Assemblages*

Fragmented and worked bone continues to be problematic for accurate identification using traditional morphology-based analyses. In this study, we apply a number of ZooMS (Zooarchaeology by Mass Spectrometry) techniques for the identification of bone points from two precontact Iroquoian village sites in southern Quebec, Canada. The predominance of white-tailed deer in the mammalian faunal assemblages of both sites, combined with the approximate size of the original bones, led to the initial assumption that the majority of the bone points found were likely to have been made of this animal. A preliminary nondestructive study of two of these points, first reported at the 2016 SAA conference, revealed the unexpected species identification of bear. Further testing of additional points from the sites has revealed a wide variety of surprising species, rather than the expected result of deer. These identifications highlight the importance of biomolecular techniques, such as ZooMS, in providing reliable and accurate species determinations, particularly for worked bone. It also provides a cautionary tale in applying general faunal assemblage assumptions to worked artifacts, which has implications for the interpretation of species-specific importance.

McGuire, Randall (Binghamton University)

[393] *How Modern Boundaries Blind Us to the Precolumbian Known World: A View from the Southwest/Northwest*

Archaeologists live in a North America divided by lines. These lines include the borders of nations, the boundaries of states and provinces and the limits that we as archaeologists have drawn around culture areas. These lines affect in subtle and complex ways, how we frame questions, how we define the boundaries of our studies, what journals we read, what colleagues we talk to, where we go to school and dozens of other aspects of archaeology. Most if not all of these lines had no meaning for the ancient peoples of the continent. Nowhere is this clearer than in the Southwest of the United States and the Northwest of Mexico. Here archaeologists have traditionally drawn a hard boundary between a Southwest and a Mesoamerican culture area. The national border between the United States and Mexico has aided and abetted in this conception. International, collaborative research has allowed archaeologists working in northern Mexico to transcend both the political border and the cultural areas. The result of this research has been a more dynamic, integrated and expansive understanding of interregional interactions on a continental scale.

[334] *Discussant*

McGuire, Kelly (Far Western Anthropological) and William Hildebrandt (Far Western Anthropological Research Group)

[383] *The Role of Portable Rock Art during the Northern California Archaic Period*

One of the largest and oldest portable rock art assemblages identified in North America has been documented in the upper reaches of the Sacramento River in Northern California. This florescence of stylistic activity, commencing as early as 6,000 years ago, appears to be a symbolic manifestation of group identity and a harbinger of the rise of social and territorial complexity in this region. In this paper we explore the linguistic, social, and ecological variables that may have given rise to this burst of symbolic expression.

McInnes, Will [49] see Holmes, Keith

McIntosh, Brandon (Washington State University)

[181] *What Doña Ana Phase and Modern Jackrabbits (Lepus californicus) Can Tell Us about Climate Change in the Southeastern Southwest*

This paper documents the environmental conditions of the Tularosa Basin/Hueco Bolson during the Late Formative Period in the Jornada Mogollon Region of the U.S. Southwest by comparing stable carbon isotope values of black-tailed jackrabbits (Lepus californicus) from archaeological site LA 12361 to modern jackrabbits in southern New Mexico and west Texas. Recent research by Stephen Smith and his collaborators provides evidence that carbon isotope values of jackrabbit bone collagen produce an effective proxy for the plant communities, and by extension the environmental conditions, within which these herbivorous animals lived and foraged. Knowing this, it is possible not only to understand jackrabbit diet and environmental conditions in prehistory, but also to compare dietary and environmental proxies with modern jackrabbit stable carbon values to document how the environment has changed since the thirteenth century. A comparison between archaeological and modern jackrabbits provide a deeper temporal context for understanding climate change in the Tularosa Basin and Hueco Bolson. Additionally, a discussion of the utility of stable hydrogen isotope analysis for differentiating between jackrabbit diets biased toward either C4 or CAM plants will be presented as a method to increase interpretive precision of dietary and environmental variability.

McIntyre, Jordan [140] see MacDonald, Douglas

McKechnie, Iain (University of Victoria and Hakai Institute)

[77] *The Maritime Fur Trade before the Maritime Fur Trade on the Pacific Coast of North America*

The maritime fur trade on the northwest coast of North America (ca. AD 1778–1850) was a historically consequential process that unfolded throughout the Indigenous territories of the Pacific coast. Tens of thousands of astronomically valuable sea otter pelts were traded by Indigenous chiefs with visiting ship captains, who then transported these pelts across the Pacific and sent profits home. The massive wealth generated by this colonial trade encircled the globe but also amplified existing political dynamics within and between Indigenous communities that continue to have political and ecological reverberations today. While this iteration of the “maritime fur trade” is well documented, much less is known about how this short-lived trade was preceded by thousands of years of intensive occupation, use, and political control of the coast, including the role of otters in Indigenous hunting traditions and governance as well as the material culture of adornment and trade. This presentation reviews the zooarchaeological evidence for sea otters from hundreds of archaeological settlements along the coast and sketches some historical ecological hypotheses about the former abundance of this iconic marine mammal species, whose populations are recovering and once again exerting impacts on coastal ecosystems and the maritime foodways of Indigenous coastal communities.

[313] *Discussant*

[49] *Chair*

McKechnie, Iain [49] see Holmes, Keith

McKechnie, Iain [49] see Duffield, Seonaid

McKee, Arlo [126] see Lawrence, Ken

McKee, Brian (University of Arizona) and Christopher Taylor (Eco PLAN)**[9] *Shadows of War, Shadows of Peace: Sites from El Salvador's Civil War***

The Salvadoran civil war, fought from 1980 to 1992, devastated the country and left 75,000 to 100,000 people dead. Much of the worst fighting was in the northeastern department of Morazán. Numerous battles were fought there, where several terrible civilian massacres occurred as well. Through most of the war, northern Morazán was a primary stronghold of the FMLN guerrillas. The poster examines two civil war sites in northern Morazán. The first, Cerro Pelón—the northern spur of Cerro Gigante—was one of three neighboring mountains involved in numerous battles, especially in the early 1980s. Features there include foxholes, trenches, an air raid shelter, a fortification wall, and a bomb crater. The second site is related to the disarmament of the FMLN following the signing of the Chapultepec Peace Agreement in January 1992. Shipping containers monitored by U.N. observers, as well as by representatives of both sides, were used to deposit arms prior to their being decommissioned. The study integrates interview data and historical resources with the archaeological remains to elucidate the nature of the war and the succeeding peace.

McKenna, Moriah (Connecticut College) and Anthony Graesch (Connecticut College)**[260] *Anthropogenic Landscapes in Southern New England: An Archaeological Investigation of Farming Practices on an Eighteenth-Century Colonial Farmstead in Southeastern Connecticut***

The now-forested New England landscape has been shaped substantially by long-term human activities. Partitioned by thousands of miles of stone walls, the young and dense woodlands visible today are a consequence of intensive clear-cutting and farming activities in the eighteenth and nineteenth centuries. In this study, we apply the theory and method of landscape archaeology to the study of farming practices at an eighteenth-century, 49-acre colonial farmstead in southeastern Connecticut. We present data collected with an array of methods—lidar, penetrometry, archaeological reconnaissance, subsurface testing, vegetative survey, and aerial photography—that, when combined, provide a fuller synthesis of humans' uses of landscape. We highlight, in particular, the results of pedestrian survey, and we show how typologies of stone concentrations and stone wall barways may be productively linked to variability in routine agricultural practices across farmstead fields. When aggregated in a GIS, these data not only shed light on relationships of past land use to contemporary plant communities, but they also provide a spatial and economic context in which to consider the roles of slavery and indentured labor on early colonial farms.

McKillop, Heather (Louisiana State University)**[281] *Underwater Transect Excavations, Sediment Coring, and Remote Sensing at the Paynes Creek Salt Works***

Following the discovery and mapping of over 100 salt works in a shallow, salt-water lagoon system, a collaborative, interdisciplinary research project was initiated with funding from NSF to examine the ancient landscape, sea level rise, use of the wooden buildings for salt production and as residences, and reconstruct the underwater sites using 3D GIS. Sediment coring across the lagoon system identified red mangrove peat, an indicator of actual sea level rise, as well as a plethora of pollen that revealed changes in vegetation patterns. An automated research vessel imaged the seafloor, along with air photos from a drone framing the underwater sites in the modern mangrove ecosystem. Transect excavations through wooden buildings and across open areas indicated the buildings were associated with salt production, with little activity outside buildings. A lagoon lab set up on the edge of underwater sites was used to sort, record, and analyze briquetage and other artifacts. Selected salt-water saturated artifacts were 3D scanned in the evenings at our base station and returned for storage underwater. Exhibits featuring 3D printed replicas of artifacts from the Underwater Maya project were established working with local stakeholders.

[372] *Discussant*

[281] *Chair*

McKillop, Heather [281] see Howie, Linda

McKinney, Caroline (University of Florida), Sarah Hlubik (Rutgers University) and David R. Braun (George Washington University)**[154] *Applications of Multispectral Imagery to the Archaeology of Human Origins***

Multispectral imagery is a powerful tool for various disciplines that use landscape scale spatial patterning to understand and identify underlying geochemical variations. Paleontologists have used multispectral imagery in numerous locations; however, it has not been extensively applied in the study of archaeological sites associated with human fossil localities in East Africa. Extensive geological exposures combined with laterally expansive volcanic ashes in the Turkana basin make this an ideal location to apply this technique. Here we present a study using 2-m resolution multispectral imagery (provided by the GeoEye Foundation) to investigate the location and patterning of archaeological sites in the Okote Member (1.6–1.39 Ma) of the Koobi Fora Formation in an attempt to identify potential archaeologically productive sediments in the Karari region of the Turkana Basin. Our results indicate the potential of this technique for identifying certain features of the archaeological record but also highlight the difficulties associated with applying this technique in a geologically heterogeneous environment. This research was supported by the National Science Foundation International Research Experience for Student program (OISE-1358178 and 1358200).

McLaren, Duncan (Hakai Institute), Daryl Fedje (Hakai Institute), Gitla Elroy White (Central Coast Archaeology), Seonaid Duffield (University of Victoria) and Alisha Gauvreau (University of Victoria)

[49] *Archaeological Investigations of the Intertidal Ecotone on the Central Pacific Coast of Canada*

On the outer central Pacific coast of Canada, the intertidal zone is a highly productive ecotone that lies between temperate rainforest and marine biomes. The tide comes in and out over five vertical meters twice every day. While the tide is out, our research teams have been investigating archaeological aspects of intertidal strata, artifacts and features. Stratigraphically the intertidal zone provides a window into the late Pleistocene archaeology of the region. Our subsurface testing into beach deposits has uncovered preserved late Pleistocene strata with associated flakes, cores, projectile points, wood chips and human footprints. Some early Holocene assemblages have also been found which include animal bones accumulations and lithics. A variety of petroform features are prevalent on beaches in front of later Holocene shell middens including canoe runs, circular meeting places, cleared trails and activity areas, fish traps, and clam garden walls. Overall, archaeological investigations in the region point to the long-term importance of the intertidal ecotone as a place for focused and intensive land and resource use as well as social interaction.

McLaren, Duncan [49] see Duffield, Seonaid

McLaughlin, Rowan (Queen's University Belfast), Katrin Fenech (University of Malta), Rory Flood (Trinity College Dublin), Michelle Farrell (Queen's University Belfast) and Ronika Power (University of Cambridge)

[133] *Rhythms of Stability and Change in the Central Mediterranean*

This paper explores changing patterns of isolation in prehistoric island societies, and their ongoing connections with the wider world. The case study is the expansion of agriculture in Southern Europe in the sixth millennium BC, and subsequent landscape and cultural evolution in the Maltese archipelago. This was a series of maritime events, establishing connectivity between Mediterranean islands whose inhabitants' 'Neolithic package' lifeway permitted high-density settlements in small islands. In Malta, where unique Neolithic art and architecture ultimately flourished, farming was established by 5500 BC, and some enduring stability ensued. But there was limited continuity—sudden change occurs in the archaeological record of various timeframes, as do phases of potential abandonment—although these are difficult to resolve using archaeological data alone. Paleoenvironmental evidence is therefore used to fill the gaps. Indeed, AMS 14C dating has revealed that episodic rhythms of stability and change were commonplace in prehistory. The timing and magnitude of these events in Malta are explored in this paper, revealing an island world whose cultural responses to the challenges of prehistoric life were predicated on the archipelago's unique intersection of isolation, size, and available resources.

McLay, Eric (University of Victoria)

[334] *Ancestral Landscapes of the Salish Sea: Exploring Inland Shell Middens, Social Memory, and Coast Salish Narratives*

This paper will explore indigenous and archaeological ways of understanding "inland shell middens" in the Salish Sea on the Northwest Coast, British Columbia, Canada. Archaeological evidence suggests inland shell middens represent depositional practices that may have embodied new strategies of social memory and ritual practice beginning in the Marpole Phase (2400 to 1200/1000 cal BP). To move beyond the deeply plumbed Northwest Coast ethnographic literature to interpret the archaeological past, ethnographic research will draw upon dialogues with descendant Coast Salish peoples today about how their ontologies, cultural beliefs, values, lived experiences and daily practices associated with the ancestral dead and nonhuman beings and ancestral objects powerfully shape Coast Salish understandings of their own settlement history.

McLeester, Madeleine (University of Chicago) and Mark Schurr (Notre Dame)

[102] *Middle Grant Creek: A Rare Example of a Single Component Huber Phase Site on the Illinois Prairie*

Our understanding of the protohistoric Huber phase is limited by our small sample of sites from this complex period. We present preliminary findings from the summer 2016 excavation at the Middle Grant Creek (MGC) site at Midewin National Tallgrass Prairie in Wilmington, IL. The site is a well-preserved single component Huber phase, warm weather camp that survived historic farmsteads and the construction and abandonment of an Army arsenal. MGC expands the sample of Huber sites and provides needed data on lifeways during the final period before European arrival. We expect data from MGC to help refine our understandings of seasonality, mobility, and site types of Huber communities as well as inform possible down-the-line impacts of the fur trade. As one of the few single component sites in the region, data also help us untangle relationships between the multiple late prehistoric communities in the region and refine existing regional typologies.

McLeod Frasier, Brenna [378] see Szabo, Vicki

McManamon, Francis (Center for Digital Antiquity—ASU)

[18] *Online and In-Person Professional Training for Archaeological Data Management and Digital Curation*

This presentation describes a series of professional training workshops created by the Center for Digital Antiquity that are designed to introduce archaeologists to the basic aspects of managing and curating digital archaeological data. In the last quarter century, the creation and use of digital data in archaeological investigations has become routinely. Documents, images, datasets, and geospatial data in modern archaeology are now nearly always in digital formats. Research projects, CRM firms, public agencies, and individual scholars who conduct archaeological investigations use a variety of computer systems for collecting, describing, analyzing, and reporting the their data. However, the curation of these digital data once a project is completed often is overlooked as an important action and seldom treated with the same rigor as the data creation, description, and analysis. The Center for Digital Antiquity was established to improve the curation of archaeological data so that it can be more easily discovered, accessed, and reused. One of the most common challenges of carrying out this mission is the lack of understanding in the archaeological community of good digital data management and curation practices.

[205] *Moderator*

[66] *Discussant*

McManus-Fry, Ellen [127] see Britton, Kate

McMichael, Alice Lynn (Michigan State University)

[372] *Discussant*

McMillan, Rhy (Pacific Centre for Isotopic and Geochemical Research, UBC), Deidre Cullon (University of Victoria, Dept. of Anthropology) and Heather Pratt (Golder Associates)

[47] *New Radiocarbon Dates and Methods for Elucidating the Extent and Timing of Use for Intertidal Fishing Features on the Northwest Coast*
Acquiring accurate and precise dates for archaeological materials and features is fundamental for investigating human history on the Northwest Coast (NWC) of British Columbia, Canada. Remarkably few radiocarbon dates for intertidal features exist in the literature, and they are only associated with features that yield objects which can be directly dated, such as fish traps containing wooden stakes. Various numerical and relative dating techniques have been applied to other types of intertidal features, although these methods cannot constrain intricate temporal variations. Thus, wooden stake features provide some of the best opportunities to evaluate how the intertidal zone on the NWC was used and managed by people during the late Holocene. In this study, we present 99 new calibrated radiocarbon dates from intertidal fishing features on the NWC that define spatio-temporal trends related to the extent and timing of use for such features.

McMillan, Rhy [49] see Cullon, Deidre

McNeil, Cameron L. (Lehman College, CUNY)

[71] *Tracing Pathways of Power, Identity, and Landscape at Río Amarillo, Copan Valley, Honduras*

During the Late Classic period, the ancient community of Río Amarillo was actively engaged in the politics of the city of Copan, whether willingly or not. Some have suggested that the fertile bajos of the Río Amarillo East Pocket may have produced food for the city to its west, ameliorating shortages that could have arisen due to its rising population. Archaeological research conducted by the Proyecto Arqueológico Río Amarillo, Copan (PARAC) since 2011 has recovered information regarding both the relationship between Río Amarillo and Copan, and the relationship between Río Amarillo and its environment from the Late Classic to the Postclassic period. The presence of Copan's power within the town of Río Amarillo is most visibly evidenced by a seventh-century altar that mentions Ruler 12, and later by the construction of a building bearing mosaic sculptures linked to Ruler 16. Both this latter structure and a censer lid found by PARAC recall the founder of Copan's Maya dynasty, K'inich Yax K'uk' Mo', who was clearly revered by at least some portion of the Río Amarillo population. Analysis of sediment and botanical samples has also provided insight into the types of crops grown around the site and consumed by its inhabitants.

[39] *Chair*

McNeil, Cameron L. [71] see Capellin Ortega, Anarrubenia P.

McNeil, Lynda

[375] *Uintah Basin Basketmaker II Anthropomorphic Style: Antecedent and Ancestral to Classic Vernal Fremont Style Rock Art*

In his recent analysis of petroglyphs in the Uintah and San Rafael zones east of the Wasatch Mountains, Keyser (2016) identifies a subset of Fremont style figures as "solidly pecked trapezoidal body style Fremont." In this paper, I expand upon Keyser's analysis by adding to this stylistic repertoire a set of anthropomorphic figures that are largely similar to, but lack Classic Fremont diagnostic features, such as horned or winged headdresses, or body decorations, such as necklaces. Rather than fitting the category of Classic Fremont, I argue that this small assemblage represents a transitional or bridging style linking Eastern Basketmaker anthropomorphic style (Durango, Colorado and Los Pinos, New Mexico zones to the south) and Classic Fremont style in the Uintah Basin (specifically the Cub Creek and Cocklebur Wash, Dinosaur National Monument area). I interpret this evidence of stylistic continuity, correlated with the presence of early maize (AD 250–400) in the Uintah Basin (Talbot and Richens 1996; Ortman and McNeil 2015), to suggest that Kiowa-Tanoan speaking EBM maize farmers from southwestern Colorado migrated to the Cub Creek area where they reproduced EBM solidly pecked trapezoidal style which was antecedent and ancestral to the Classic Vernal style.

McNiven, Ian (Monash University, Australia)

[380] *"Why those old fellas stopped using them?" Spiritual and Ritual Dimensions of Stone-Walled Fish Trap Use Among the Yanyuwa of Northern Australia*

Archaeological approaches to stone-walled tidal fish traps of Indigenous Australians focus on the technology and subsistence, with chronological development linked to demands of increased food production associated with demographic change and social intensification. For the Yanyuwa "Saltwater People" of tropical northern Australia, old stone-walled fish traps found within the intertidal zone are associated with the creative acts of ancestral spirit beings. As such, these fish traps are imbued with spiritual potency such that use requires specialized ritual practices (involving ochre and smoke) by senior men who also prescribe who can and can't use the traps and eat the resulting catch. Today these traps lie dormant, not because the demand for fish has decreased but because of the demise of old highly initiated men of Law. These senior men not only possessed the requisite ritual knowledge to repair and activate the traps but also the specialized social and political knowledge to ensure adherence to strict and religiously codified laws and rules governing fish catch consumption among the community. The Yanyuwa teach us that socioreligious factors may be of equal or greater importance than socioeconomic factors in understanding why peoples of the past decided to use and disuse fish trap facilities.

[168] *Chair*

McPherron, Shannon P. (Max Planck Institute)

[287] *Additional Statistical and Graphical Methods for Analyzing Artifact Orientations and Site Formation Processes from Total Station Proveniences*

The orientations in three dimensions of clasts within a deposit are known to be informative on processes that formed that deposit. In archaeological sites, a portion of the clasts in the deposit are introduced by non-geological processes and these are typically systematically recorded with total stations during excavations. By recording a second point on elongated clasts it is possible to quickly and precisely capture their orientation. The statistical and graphical techniques for analyzing these data along with some comparative data are already well published. This paper advances this area of research by presenting methods to address some shortcomings in current methodologies. These include 1) a method for calculating confidence intervals on orientation statistics, 2) a method for assessing the probability that two assemblages have different orientations in three dimensions is presented based on permutations testing, and 3) a method is presented to examine spatial variability in orientations based on a moving windows approach. The raw data plus the R code to implement these methods and those already described in McPherron (2005) will become open access to help further their use in assessing archaeological site formation processes.

McPherron, Shannon P. [38] see Lin, Sam

McRae, Ryan (Yale University Department of Anthropology), Gary Aronsen (Yale University Department of Anthropology) and Erin Gredell (Yale University Peabody Museum of Natural History)

[365] *Bones, Beads, and Birds: Determining Cultural Affiliation of Skeletal Remains and Artifacts from Casuarina Mound, Brevard County, Florida*
Efforts to repatriate Native American human remains and artifacts are of immediate importance to American archaeology. Excavated in the early twentieth century, Casuarina Mound (8-Br-0122) was first dated to the Malabar II period (750–1565CE) by Irving Rouse in his 1951 publication *A Survey of Indian River Archaeology, Florida*. Historical accounts describe the removal of at least 112 skeletons and numerous funerary objects from three successive interments. A small subset of this material was donated to the Peabody Museum of Natural History at Yale University. Here, we document all human skeletal material and funerary objects from Casuarina Mound present in the collection. Represented mainly by cranial material, the individuals comprise a range of age/sex classes and present indicators of life history, health, and disease associated with cultural biomarkers. The funerary objects, despite being only a fraction of that removed from the mound, are strong indicators of cultural identification. Our documentation of Casuarina Mound human remains and artifacts at the Peabody Museum may reconnect contemporaneous elements and objects housed at disparate institutions. Such analyses contribute to the determination of ancestry and tribal affiliation using replicable and verifiable methods, and connect institutions and indigenous communities through scholarship and consultation.

McSparrow, Cormac [237] see Katzenberg, Mary A.

McSporran, Joanne [49] see Mackie, Alexander

McSweeney, Kathleen [290] see DePace, Monique

McTavish, Rachel (University of Wisconsin-Milwaukee) and Corey Hoover (University of Wisconsin-Milwaukee)

[336] *A Holistic Investigation of Economization at a Late Prehistoric Village in Northern Illinois*

The economization of lithic raw materials for Late Prehistoric groups in the midwestern United States has long been the subject of research. This research has often focused on explaining aspects of either technological or subsistence changes, such as the shift to agriculture (e.g., Bamforth 1989; Cobb 2000; Emerson, et al. 2000; Emerson and Titelbaum 2000; Jeske 1990, 2000). This project uses the underlying framework of economization used by these lithic studies and applies it to faunal remains, ceramics, and lithic assemblages from a single site in northern Illinois, the Washington Irving Site (11K52). The site dates to circa AD 1100–1440 (Jeske 2000). This study uses an ArcGIS spatial analysis of the distribution of the assemblages from the site to identify activity areas and discard patterns that are essential for understanding the economizing behavior used at the site. This study uses a multipronged approach to provide a holistic interpretation of changes to diet, settlement, intergroup relations and technology that were established throughout the Midwest during this period.

Mead, Kent (University of Arizona), Megan Weldy (SWCA Environmental Consultants, Inc.) and Kevin Pintz (SWCA Environmental Consultants, Inc.)

[368] *Recent New Evidence for Late Archaic Occupation in the Pecos River Valley near Carlsbad, New Mexico*

This poster presents evidence of a singular Late Archaic period habitation feature. Recent compliance excavations conducted at site LA 45730 along the Pecos River east of Carlsbad, New Mexico, have provided rarely seen evidence of occupation in the Permian Basin. A small pit structure exposed in a highly eroded floodplain terrace provides an opportunity for further insights. Few such structures have been fully documented in this region. Material remains recovered from the pit structure provide evidence for utilization of locally available riverine food sources. Intramural features show evidence for structure support posts and there is also evidence of internal storage and possibly a prepared floor. Artifacts recovered in association include two diagnostic Late Archaic projectile points. The orientation of these and other flaked-stone tools suggests intentional placement according to the cardinal directions and are postulated to represent ceremonial abandonment of the structure. This site provides valuable data for interpreting Late Archaic lifeways in the Permian Basin. This poster aims to highlight these findings and to bolster an otherwise poorly represented dataset for the Late Archaic in southeast New Mexico.

Meadow, Richard (Harvard University)

[177] *Archaeofauna and Archaeobotany studies in Northwestern South Asia: Past, Present, and Future*

Both Zooarchaeological and Paleoethnobotanical studies have been carried out on animal and plant remains from archaeological sites in northwestern South Asia for at least a century. These investigations, while providing important insights into the hunter-gatherer and agropastoral economies of the region, have lagged behind those carried out in other parts of the world in both quantity and quality. Indigenous practitioners of both subdisciplines are few, and interest in these aspects of archaeology is poorly developed locally. Studies by non-indigenous practitioners have also been limited and reports of analyses slow to be published. In this presentation I highlight reasons for these shortcomings—both institutional and intellectual—and discuss the promise for future work in the region.

Mealey, Marla [300] see Downs, Lauren

Means, Bernard (Virtual Curation Laboratory), Vinod Nautiyal (HNB Garhwal University), Mohan Naithani (HNB Garhwal University), Sudhir Nautiyal (HNB Garhwal University) and Akanksha Rai (HNB Garhwal University)

[18] *Building a Virtual Bridge Connecting Indian Himalayan Archaeology with a Virginia University and the World*

The Virtual Curation Laboratory at Virginia Commonwealth University (VCU) in Richmond, Virginia, and the Archaeology Department of Hemwati Nandan Bahuguna (HNB) Garhwal University, in Garhwal (Srinagar), India, have partnered to create three-dimensional (3D) models of artifacts and sculptures from the trans-Himalayan region of northern India. Many of these items are on display in the HNB Garhwal University Museum of Himalayan Archaeology and Ethnography. This partnership seeks to preserve these items, make them more widely available to researchers, and raise public awareness of the cultural heritage of the state of Uttarakhand. VCU students are drawing on 3D printing to create an exhibit that showcases this heritage to their fellow students and faculty.

[239] *Discussant*

Meanwell, Jennifer (MIT), Elizabeth H. Paris (University of Calgary) and Roberto Lopez Bravo (Universidad de Ciencias y Artes de Chiapas)

[322] *Shifting Domestic Economies at Postclassic Period Moxviquil: Insights from Ceramic Petrography*

The Early to Late Postclassic Period transition brought substantial changes to the political and economic organization of many regions of Mesoamerica. For the networked polities of highland Chiapas, these changes included substantial decreases in population at existing monumental centers; the establishment of new political centers in several principal highland valleys, and the establishment of an expansionary Chiapanec state in the Central Depression, centered on the city of Chiapa de Corzo. This paper examines the evolution of domestic economic organization at the highland political center of Moxviquil throughout the Postclassic period. In particular, we focus on changes in the production of utilitarian ceramic wares in Moxviquil's domestic assemblages, including vessel forms, clay sources, firing techniques, and tempering processes. Ceramic petrography highlights the technological choices made by household producers of ceramic vessels throughout the Postclassic period. Most strikingly, we observe shifts in the acquisition of resources, including clays and nonplastic inclusions such as sand, volcanic ash, and crystalline calcite. A contrast in the production techniques for the dominant medium- and coarse-ware in Moxviquil's domestic assemblages may suggest multiple, contemporaneous production communities within the local area.

Medchill, Brian (Gila River Indian Community Cultural Resource Management Program) and Kyle Woodson (Gila River Indian Community Cultural Resource Mana)

[105] *Social Inequality and Food Storage at Hohokam Platform Mound Sites in the Phoenix and Tonto Basins*

Some social theorists contend that the critical threshold in the development of complex, ranked societies is the emergence and institutionalization of inequality, or a formalized hierarchical organization that is inherited and reproduced. One pathway that elites take in establishing and institutionalizing political power is by attaining control over the economy. A key strategy of establishing economic power is to mobilize and store food surpluses. For the prehistoric Hohokam of southern Arizona, social and ideological inequalities appear to have peaked at platform mound sites during the late Classic period (ca AD 1300–1450). Some platform mounds in the Phoenix and Tonto Basins include rooms with large storage capacities, including structures with granary pedestals. These pedestals are the remains of beehive-shaped adobe storage features. This secluded storage pattern has been bolstered by the recent discovery of several large, stone-paved granary pedestals within an atypically large room in the compound of the Lower Santan Platform Mound in the Gila River Indian Community. This room provides evidence that food surplus was stored in a limited-access context, and further supports the contention that Late Classic period Hohokam platform mound communities had established complex internal ranking and institutionalized leadership positions.

Medina, Paulo (Boston University)

[386] *Demystifying Southern Lowland Chultunes: The Ritual Space Hypothesis*

This investigation's working hypothesis is that chultunes, manmade subterranean features, served as ritual spaces in the southern Maya lowlands. The hypothesis is an outgrowth of my grounding in cave archaeology. Ethnographically, even subterranean features used for utilitarian activities, such as mining, come to have sacred meaning and this phenomenon can be documented in ethnohistoric sources. However, my hypothesis has not been tested. Dennis Puleston argued for a utilitarian function of chultunes based on his perception of these features occurring exclusively in rural areas while others have argued for their more frequent location in centers. I will conduct a preliminary examination on the spatial distribution of chultunes and their relationship with other architectural features at various sites and make a connection between chultunes and caves.

Medina-González, Isabel (ENCRyM-INAH), Manuel Espinosa-Pesqueira (ININ) and Grégory Pereira (CNCR, Université Paris Sorbonne 1)

[135] *Proto-Tarascan Uacusecha Metallurgy: Issues about Technological Transition and Lost Techniques*

Within the large and rich vein of archaeological studies on Western Mesoamerican metallurgy (ca. AD 800–1500), a large body of literature is devoted to the metal production of the Tarasco Kingdom (AD 1420–1522), since by AD 1450 this became the most important center of precolumbian metalworking. Indeed many scientific studies have focused on the material and the technological aspects of Tarascan metal artifacts, particularly of copper and copper alloy bells. In comparison, little is known about Uacusecha metalwork—identified as the predecessor of the Tarascan—an approach that offers to provide knowledge on a key and yet poorly documented phase of middle Western Post-Classic Metallurgy. This paper follows recent advances in Uacusecha metallurgy by presenting further results of an interdisciplinary scientific research based on the use of diverse analytical techniques (OM, XRD; SEM-EDXRF) on a small metal collection recently discovered in Malpaís Prieto Archaeological Site, near Zacapu, Michoacán, Mexico. As a result, this paper presents a groundbreaking pilot study that discusses issues about technological transitions and lost techniques of Western metallurgy, which included the production of copper, copper alloys and silver artifacts.

Medina-González, Isabel [135] see Espinosa-Pesqueira, Manuel

Medina Martínez, Lorena, Raúl Barrera Rodríguez (PAU-MTM-INAH) and José María García Guerrero (PAU-MTM-INAH)

[252] *Hallazgo de la Tumba de Miguel de Palomares*

En el año 2016 el Programa de Arqueología Urbana (PAU) del Instituto Nacional de Antropología e Historia (INAH), llevó a cabo excavaciones frente a la Catedral Metropolitana de la Ciudad de México. Además de encontrarse vestigios arquitectónicos de inicios del periodo virreinal, se descubrió una lápida mortuoria con un epitafio alusivo al canónigo Miguel de Palomares. Al continuar con la excavación, se localizó un entierro secundario que debe corresponder al personaje mencionado en la lápida. En esta exposición nos referiremos a este hallazgo y su importancia no solo por ubicarse en el periodo virreinal temprano sino también por tratarse del descubrimiento de los restos del canónigo quien formó parte del primer cabildo eclesiástico de la Nueva España. Los estudios continúan; diferentes especialistas que colaboran en esta investigación, realizan análisis osteológicos, radiológicos, moleculares, de isótopos y genéticos, que serán complementados con la investigación histórica de archivo para corroborar la identidad del canónigo, así como para dar a conocer los aspectos biológicos y las circunstancias en las que vivió dicho personaje.

Meehan, Pascale (University of Colorado, Boulder)

[82] *Examining Rural Responses to Political Collapse: The Early Postclassic at Monte El Santo, Oaxaca, Mexico*

Recent archaeological research at the site of Monte El Santo, Oaxaca, Mexico, examines how the rural community of Monte El Santo responded to the political collapse of the Río Viejo polity during the Early Postclassic Period (800–1100 CE). The collapse ushered in important changes for the coastal inhabitants of the Lower Río Verde Valley—the site of Río Viejo experienced a sharp decline in population, and a newly formed population center at San Marquitos grew to rival Río Viejo in size. While previous research at Río Viejo has demonstrated that after the political collapse site residents were able to produce and manage surplus cotton and gain greater access to long-distance goods, research at Monte El Santo explores the degree to which people in rural communities responded to these changes. This presentation will discuss research of domestic contexts at Monte El Santo. This research, which is ongoing, will help determine how rural actors engaged with the changing political, economic, and social climate of the Early Postclassic. These data will be compared to those from Río Viejo in order to discuss whether the post-collapse economic opportunities available to inhabitants at Río Viejo also existed for those at Monte El Santo.

Meehleder, Amy [299] see Enloe, James

Megarry, Will (Queens University Belfast), Gabriel Cooney (University College Dublin) and Rob Sands (University College Dublin)
[376]

A Multiscale Landscape Approach to the Production of Polished Stone Tools in Neolithic Shetland
The Shetland Archipelago at the very north of Scotland contains one of the best preserved Neolithic stone tool quarries in Western Europe. Recent fieldwork by the North Roe Felsite Project (NRFP) has considerably advanced our knowledge of this quarry landscape and the production of polished stone axes and Shetland knives. The NRFP has explored the landscape dynamics of this activity on a range of scales; from regional geological survey and workshop prediction using multispectral satellite imagery, to the intrasite distributions of artifacts and debitage, and targeted excavation of quarry pits. While felsite dykes are present throughout the quarry complex, definite evidence for quarrying is only visible at certain locations. Excavation has shown that quarrying methods and intensity of extraction differs between sites. The process of felsite extraction, and the possible local and regional networks used for its distribution across the archipelago, are explored in this paper. Using landscape modeling techniques the location of the quarries are explored with particular focus on the visual and spatial relationship between the quarry pits and their landscape, and between the quarry landscape and the wider region.

Megarry, Will [216] see Cooney, Gabriel

Mei, Jianjun [26] see Chen, Kunlong

Meier, Jacqueline [340] see Munro, Natalie

Meierhoff, James (University of Illinois at Chicago)

[280] *Consumer Culture at the Nineteenth-Century Maya Refugee Site at Tikal, Guatemala*

In the mid-nineteenth century, Maya refugees fleeing the violence of the Caste War of Yucatán (1857–1901) briefly reoccupied the ancient Maya ruins of Tikal, Guatemala. These Yucatec speaking refugees combined with Lacandon Maya, and later Ladinos from Lake Petén Itza to form a small, multiethnic village in the sparsely occupied Petén jungle of northern Guatemala. The following paper will discuss the recent archaeological investigation of the historic refugee village at Tikal, with a focus on the recent analysis of commercially made British ceramics, glass, and copious metal artifact assemblages; and includes a discussion on what the villagers may have been trading to obtain such goods, such as tobacco and other jungle products. As will be demonstrated, despite its remoteness from urban centers, the Tikal Village was well connected to trade networks of surrounding societies, demonstrated by the quantity and diversity of foreign items found in their homes and in vast midden deposits around this short lived community.

Meissner, Nathan (University of Southern Mississippi), Marc Marino (University of Arkansas) and Emmalea Gomberg (University of Southern Mississippi)

[71] *Political Dynamics and the Organization of Chert Production in the Copán Valley*

This study focuses on the social aspects of craft production among outlying populations of the greater Copán Valley of Honduras during the Late Classic to Early Postclassic transition (AD 800–1200). Lithic data from four valley sites including Rastrojón, Río Amarillo, Quebrada Piedras Negras, and Site 29 are compared to elucidate raw material procurement strategies and methods of chert reduction by local producers. Interesting differences emerge among the sites concerning changes in raw material procurement and technological strategies during a period of proposed Copán expansion and subsequent waning of political presence. A full sequence of production activity was more frequent at sites like Río Amarillo but not others—a trend that appears to increase during later occupations of the Early Postclassic and suggests intensified crafting practices at this locale. Thus, this study adds to a growing body of intraregional investigations of the Copán hinterlands by highlighting varied strategies of craft production during times of pronounced political change.

Mejía, Martha [174] see Archila Montanez, Sonia

Mejía Ramón, Andrés (Pennsylvania State University) and Luis Barba (Universidad Nacional Autónoma de México)

[13] *Of Mud and Magnets: Archaeometric Prospection at the Site of Altica*

The Formative Period site of Altica in the Patlachique range poses many problems when designing an excavation strategy. Three millennia of erosion, and centuries of chisel plowing have eviscerated the site, removing any traces of architecture and in situ remains above the tepetate (local bedrock). As such, in the early stages of the Altica Project, the primary concern was the detection and identification of sub-surface remains inside intact bedrock-incised pits. In most archaeological sites, the simplest way to do this would be using geophysical apparatuses such as ground-penetrating radar or a soil electric resistance meter. Although it is located at the top of a hill, strong, frequent localized rain frequently flooded the terraces of interest for days on end, making it impossible to detect subsurface features using the aforementioned methods. Because of these limitations, we were forced to exclusively use magnetic gradient prospection—with largely successful results—to detect sub-surface pits. This paper will discuss the method used, the various difficulties encountered during prospection, and the results of the magnetometric study.

Mekonnen, Habtamu

[171] *The Pre-Aksumite to Aksumite Transition in Eastern Tigray: Ceramic Evidence from Ona Adi*

The Pre-Aksumite to Aksumite transition (PA-A transition) is critically important for the culture history of the Horn of Africa. This period in Western Tigray (400/300–150 BCE) represents a cultural break between the Sabaeen-influenced Pre-Aksumite period (≥800–400/300 BCE) and the predominantly indigenous kingdom of Aksum. Pre-Aksumite and Aksumite polities in Western Tigray were not directly related and marked by significant sociopolitical change. The emerging picture of the PA-A transition in Eastern Tigray differs from that observed in the Aksum region, based on continuity in site occupation and minimal Sabaeen influence. Although Sabaeans were present in Eastern Tigray, their socioeconomic impacts may have been minimal or indirect. Moreover, recent surveys have found that a heterarchical political system was in place during the Aksumite period. Analysis of Ona Adi ceramics are revealing patterns of continuity and gradual change in the distribution of decorations including incisions, black topped, notches on the lip and grooved decorations. The PA-A transition also witnessed the appearance of new styles such as punctuated and corrugated vessels. Additional work is needed beyond Aksum-Yeha to explore the regional implications of the PA-A transition.

Melendez, Juan (Washington University in St. Louis)

[392] Ancient Greenstone Mosaic Masks from the Central Maya Lowlands of Guatemala: A Contextual and Technological Study

To date, nine greenstone mosaic masks (GMM), recovered in eight royal and one elite interment, have been found in association with other grave goods belonging to ancient Maya individuals from Tikal, El Zotz, and El Perú-Waka'. Nearly 1,000 tesserae compose these nine GMM, however to date it is unknown what the mosaic masks originally looked like as these were found unassembled. Nonetheless, prior to carrying out preliminary reintegration and restoration projects, a manufacturing study was deemed necessary. This paper presents the technological analyses carried out to determine the material of the tools used to create each tessera. This analysis is based on scanning electron microscope (SEM) observations of selected sectors of the tesserae. By comparing the SEM observations of contemporaneous greenstone materials obtained from experimental archaeology processes, I expect to identify manufacturing signatures that could suggest one or multiple traditions of GMM production. In addition, the contextual information of the GMM that could provide insights about the sociopolitical dynamics in the Central Maya Lowlands during the Early and Late Classic periods (AD 350–750) will be covered in this paper.

Melgar, Emiliano (Museo del Templo Mayor-INAH) and Joan Mathien (Department of Anthropology, University of New Mexico)**[23] The Manufacturing Traces of the Turquoise Objects and the Lapidary Technology from Chaco Canyon: An Experimental Archaeology Approach**

There are thousands of turquoise objects found in different sites of the American Southwest, and Chaco Canyon, New Mexico, is known as one of the principal areas that concentrated most of them. Unfortunately, most of the researches about these stones had been focused on their symbolic meaning, morphology, provenance, trade and use, but very few study their manufacturing traces and the organization of their production. In this paper, we will present a technological/traceological approach to analyze and characterize their manufacturing techniques through the employment of Experimental Archaeology and Scanning Electron Microscopy (SEM). The comparison of the turquoise assemblages from different contexts and sites located at Chaco Canyon shows relationships with the lapidary tradition of the American Southwest, but with a particular technological pattern that differs with other turquoise objects from New Mexico. With these new data of the geography of the manufacturing techniques, it is possible to appreciate new nodes of interactions and trends of circulation of the turquoise pieces (raw materials, blanks, and finished objects) among the sourcing areas, the workshops, and the final consumers.

Melgar, Emiliano [94] see Solis, Reyna

Meling, Trond (University of Stavanger)**[35] Settlement and Rituals: The Red Deer at Late Mesolithic and Early Neolithic Settlement Sites in Southwest Norway**

The red deer is one of the most common motifs at several Late Mesolithic rock carving sites along the coast of southern Norway. It is assumed that this animal was both an important food resource as well as an object of rituals and religious beliefs during this period. The focus of this paper will be to examine how the red deer appears in different contexts at settlement sites during the Stone Age, and to explore how these contexts reflect diverse activities, including rituals and ceremonies. Our knowledge about how animals have been a part of rituals at Stone Age settlement sites is very limited because of bad preservation for bones. Recent excavations of three adjacent settlement sites from Rogaland in southwest Norway have however produced new insights. The sites are dated to the latter part of the Late Mesolithic and the Early Neolithic, around 4000 cal. BC. The preservation conditions were unusually good and around 50,000 fragments of bones were recovered. The great majority of these bones are from red deer. This paper aims to explore entanglements between people and red deer and the diversity of structural remains and material culture springing from this in the late Mesolithic.

Meloche, Chelsea (Simon Fraser University)**[247] Finding Skeletons in Our Closets: Legacy Collections and Repatriation**

Contemporary standards of collections management ensure that materials collected during archaeological fieldwork are well documented, provenienced, and catalogued within a database for future research purposes. These standards have come to be crucial to contemporary archaeological practice, however, this was not always the case. Historically, certain objects were often considered more important than a collection as a whole. This resulted in poorly documented collections, with miscatalogued, incorrectly provenienced, or missing items. Since they continue to occupy a large part of contemporary repositories, these so-called legacy collections present a unique set of collections management issues. Their minimal standards of documentation become particularly problematic in the context of repatriation requests. This presentation will examine these issues in the case of the Rickley collection at the University of Windsor. By recounting the excavation, curation, rediscovery and repatriation of the collection, I will present this case as an example of the complications that can arise when legacy collections become the focus of a repatriation request. In doing so, I will reflect on the implications of dealing with historical collections in contemporary repatriation cases, the current efforts underway to attend to these issues, and the importance of addressing both the existence and future of these oft-forgotten collections.

[247] Chair

Meltzer, David (Southern Methodist University)

[79] Discussant

Menaker, Alexander (University of Texas-Austin)**[331] Identity and Offerings in the Southern Peruvian Andes: A Comparative Study of the Painted Tablets and Discs Tradition of the Arequipa region, Southern Peru**

Inka and Spanish imperial projects in the Andes frequently targeted local beliefs and ritual practices, albeit in dissimilar ways. Understanding the effects of imperial projects is not possible without a clear sense of the local ritual landscape and its (in)compatibility with state religions and other practices spread across state networks. The painted tablet and disc tradition of the Arequipa region in the Southern Peruvian Andes offers a particular case for studying local and regional rituals and identity. Although it has been primarily treated as pre-Inka in previous scholarship, recent evidence from Andagwa complicates this picture, raising questions not only about Inka religious expansion in the region, but also potential obstacles for Spanish evangelization practices. Drawing from archaeological and historical research, the painted tablet and disc tradition presents an important prism to examine how rituals inform identity and are manifest in humans' relationships with the landscape amid non-state and colonial contexts.

Mendelsohn, Rebecca (University at Albany, SUNY)**[182] Izapa and Highland El Salvador: Terminal Formative and Classic Period Ties**

This paper explores coastal and highland interaction in southern Mesoamerica between coastal Chiapas and highland El Salvador. Published accounts of Salvadoran excavations have reported that ties between highland Salvadoran sites and Mesoamerica declined at the close of the Formative period with the eruption of the Ilopango volcano. The dating of the Ilopango eruption has since been updated, and a renewed look at interaction between these

zones is necessary. This paper reviews archaeological evidence including ceramics, burial and offering traditions, construction techniques, and monuments, to highlight similarities between the sites of Izapa, Chalchuapa, and Quelepa before and after the Ilopango eruption. Ties between Izapa and Chalchuapa are especially strong. These links suggest greater cultural continuity in both regions during the Terminal Formative to Early Classic transition than has been presented in past reports.

Méndez, Andrea [62] see Torres, Mauricio

Méndez, César [32] see Reyes, Omar

Méndez, César (Dpto. Antropología-Universidad de Chile), Antonio Maldonado (CEAZA-Universidad de La Serena), Andrés Troncoso (Dpto. Antropología-Universidad de Chile), Amalia Nuevo Delaunay (Dpto. Antropología-Universidad Alberto Hurtado) and Sebastian Grasset (Independent-FONDECYT #1170408)

[143] *Human Responses to Holocene Aridization South of the Atacama Desert (31° to 32° S), the Meaning of Differences in Landscape Use*
The geographical band between 31° and 32° S, from the Pacific to the Andes, lies in the southernmost part of the semiarid north of Chile, south of the Atacama Desert. Multidisciplinary research to the north and south of the Choapa River's mouth is uneven, thereby in need of new data for understanding the relative intensity of the human traces across the landscape and the human interactions with environmental changes. Currently, the combined pollen records in the coast and highlands indicate arid phases between 7800–6200 and 3500–2200 cal BP. Though the archaeological radiocarbon record spans the Holocene, changes in its distribution across the landscape coincide with these time intervals and with other minor changes. The few excavations in rockshelters north of the Choapa River's mouth have yielded dates on features and bioarchaeological material precisely within specific time gaps of the nearly-continuous record south of this area, built on coastal shell-middens and inland open-air sites. These preliminary collations posit sampling biases versus climate change as alternative mechanisms influencing the past human spatial distributions. Assessing human responses to environmental change in the margins of the desert should prove useful for the broader understanding of landscape use and its variation throughout the Holocene. FONDECYT #1170408; #1140837.

Mendez-Quiros, Pablo (Universidad Autonoma de Barcelona)

[134] *Redes viales y prácticas de movilidad en los Valles Occidentales meridionales, área Centro Sur Andina*

En este estudio proponemos una reconstrucción de la red vial de los Valles Occidentales meridionales. A partir de un trabajo de análisis e interpretación de imágenes satelitales. Esta red estuvo organizada sobre la base de diez rutas troncales, diecisiete nodos de primer orden y siete de segundo orden. Analizamos el funcionamiento del sistema de senderos, caminos y poblados durante los períodos Intermedio Tardío y Tardío y su relación con prácticas de movilidad diversas y convergentes. Discutimos en esta ponencia las estrategias de movilidad de las comunidades agricultoras y agro-ganaderas que habitaron en la costa, valles y sierra, planteando la existencia de una movilidad generalizada y multidireccional que ha sido invisibilizada bajo una visión hegemónica de la existencia de un sistema de transporte y comunicación via caravanas.

Mendizabal, Tomas [370] see Wake, Thomas

Mendoza-Vargas, Oscar Uriel [225] see Bolaño-Martínez, Nataly

Menéndez, Damaris [174] see Cagnato, Clarissa

Menocal, Tatianna (Desert Research Institute)

[367] *An Overview of Cultural Resources Monitoring at the Nevada National Security Site*

An integral component of the cultural resources management program at the Nevada National Security Site (NNSS) is the monitoring of cultural resources that have been determined eligible to the National Register of Historic Places (NRHP). The Desert Research Institute periodically conducts field evaluations of these cultural resources in order to document their condition and note any deterioration due to natural processes or unauthorized activities. NRHP eligible properties at the NNSS include prehistoric and historic archaeological sites as well as historic buildings and structures. A few of these resources are inspected annually, while others are selected from a list of NRHP eligible properties and are monitored at longer intervals. The NNSS cultural resources monitoring project is a long-term endeavor and provides a photographic and written record of these cultural resources through time and serves as an indicator of the overall effectiveness of the National Nuclear Security Administration Nevada Field Office's NNSS cultural resources program. This poster presents an overview and results of cultural resources monitoring at the NNSS with case studies of the different kinds of cultural resources found there.

Menon, Jaya (Presenter)

[167] *The Materiality of Domestic Space: Indor Khera, North India, 200 BCE–500 CE*

Most State and University-sponsored excavations in India have tended to focus on public and elite spaces, in keeping with nationalistic aims of projecting a grandiose view of the past. This has led to the inevitable marginalization of nonelite domestic spaces. One of the few cases of household archaeology in the Indian subcontinent has come from Indor Khera in the Upper Ganga Plains in northern India. Archaeological data recovered during the excavations has given valuable information on the intersecting histories of ordinary houses and households dated between 200 BCE and 500 CE in this peripheral neighborhood in a small town. The current paper is an attempt to assess and map the materiality of everyday practices of a household through a micro-study of a single house, analyzing through its various episodes of construction, use, alterations, and adjustments, the patterns illustrative of an everyday life. It is possible to do a "close reading" of the excavated data (micro-stratigraphies, features, and contextually recovered artifacts,) within a house, that will enable the identification of the location and nature of individual activities undertaken by ordinary people, as well as the flexible and changing uses of space over time.

Mentore, George (University of Virginia)

[384] *The Angel of History and the Paradise of Progress in the Scholarship of Peter Roe*

In honor of the innovative contribution by Peter Roe to the ethno-archaeological research on Amazonia, my paper will focus on the indigenous knowledge forms which invert our own logics about material objects. Roe's early willingness to allow indigenous thought to impact our scientific interpretations was well ahead of its time. Today, we on the ethnographic side of Amazonian scholarship, have little difficulty speaking in terms of the

"social life of things." Yet, even beyond, the legitimacy of the "social" within the discipline, we still retain reservations about going all the way into Amerindian thought processes to speak about the "truths" of shared subjectivity between things, animals, and humans. What happens to our modernist interpretations of studied artifacts when we extend to them the vital existence we claim only for us humans? Would they radically transform archaeology? Would they change our view of humanity? How much of a threat to current modern politics and laws of national heritage would such an altered position produce? The answers to these and other relevant questions will be posed within the paradigm of a concern for the "aesthetic," an attribute of scholarship Peter Roe long advocated for anthropological research.

Mentzer, Susan M. [85] see Pothier Bouchard, Genevieve

Menz, Martin (University of Michigan)

[376] *Craft, Commerce, and Community at Kolomoki: Domestic Craft Producers in the Woodland Period of the American Southeast*

Archaeological considerations of craft production and specialization in the American Southeast has often focused on elaborate prestige goods crafted from exotic materials. Less frequently studied is the potential for specialized production of mundane household goods. Recent research from the Southeast suggests that intensive production of such items was occasionally practiced at the household level among Middle and Late Woodland period (ca. 200 BC–AD 1000) societies, which generally lacked centralized political authority and hereditary inequality, features typically associated with economic specialization. Investigations at Kolomoki, a large Middle-to-Late Woodland mound and village complex in southwest Georgia, have produced evidence for intensive crafting within domestic contexts at a scale implying production for distribution and use beyond the household. Here I review the evidence for craft specialization and exchange from Kolomoki and attempt to situate it within an exchange network predicated upon periodic ritual gatherings associated with Swift Creek and Weeden Island interaction. I argue that periodic convergence at Kolomoki and other mound centers temporarily brought together individuals from various ecological and geological zones, providing an outlet for craft producers and visitors to exchange raw materials and finished goods.

Menz, Martin [241] see Duke, C. Trevor

Menzies, Charles (UBC)

[176] *Reimagining the Colonial Encounter through Gitxaala Eyes*

Archaeology on the north coast of British Columbia has focused on three zones of attention: Namu, Haida Gwaii, and Prince Rupert Harbour. These loci have created a kind of orthodoxy that, while reasonable in certain aspects, has unduly shaped contemporary political interactions between First Nations and the state. This paper draws from an Indigenous intellectual framework (that has appropriated the tools and techniques of anthropological archaeology) to challenge and redefine the orthodox view of the Tsimshianic north coast. By focusing on the intersection of archaeological record, settler-capitalist ships' logs, and Indigenous historical narratives this paper argues that the current archaeological understanding of the north coast of BC is seriously flawed and mired within a contemporary political economic struggle whereby the state has preferentially allied with some regional First Nations to the detriment of others.

Mercader Florin, Julio, Robert Bird (Department of Anthropology and Archaeology, Univer), Mariam Bundala (Department of Archeology and Heritage, University), Fernando Diez-Martin (Department of Prehistory and Archaeology, Universi) and Manuel Dominguez-Rodrigo (Department of Prehistory, Universidad Complutense)

[305] *Acheulean Hominin Ecology: Organic Residue on Lithics as Evidence of Plant Processing*

Several compendia have illustrated the reach of conventional approaches to exploring the origin of omnivorous diets. Included are the cost of developing large brains and bodies; tooth size/shape, enamel thickness, wear; and the chemical signal from diet on bones/teeth. Over the last decade, new interpretations of human origins have proposed a long history of fire dependence, suggesting humans are biologically adapted to cooked food. However, these studies have not provided direct indication of eco-niche exploitation, plant utilization, or what food was processed with stone tools. The context of hominin activities at Olduvai Gorge (Bed I and II) is revealed through macrobotany, ethnoarchaeology, and the analysis of pollen, phytoliths, and biomarkers. However, no studies explore the human ecology, dietary dimension, and functionality of Acheulean technologies as seen through direct evidence in the form of plant residue that may still reside on stone tool surfaces. We present lithic residue indicating:

- Proximity of wetlands /plant resources.
- Bark, resin, and lignified tissue deposited on hand axes.
- Bifaces preserved starches from underground storage organs, and some legumes. Phytoliths on hand axes derived from cork.
- Resinaceous material attached to scrapers.
- Scrapers trapped starches from the rhizome of *Typha capensis*.
- USO epidermis is attested by root bacterial fibrils.

Mercy, Kevin [300] see Dodd, Lynn

Meredith, Clayton (University of New Mexico), Christopher Merriman (University of New Mexico), Jessica Thompson Jobe (University of Texas at El Paso) and Keith M. Prufer (University of New Mexico)

[162] *Geomorphic and Isotopic Indicators of Anthropogenic Change from Holocene-Length Alluvial Deposits in the Rio Blanco Watershed*

Recent geoscientific investigations in southern Belize have focused on the Paleoindian to Archaic site of Tzib'te Yux located in the Rio Blanco watershed and dating between 3000–12500 BP as well as adjacent river terraces. Landscape-level vegetation changes are apparent within the area in the form of forest clearance by 5000 BP. Evidence of pedogenesis derived from four years of excavations and sedimentation rates established through modeling and high-precision ¹⁴C AMS dating have produced an erosional history of the wider watershed reflecting the extent of land clearance throughout the Holocene. Combined with compelling evidence for contemporaneous human occupation, these data facilitate an assessment of geomorphic, and ecological change with underlying climatic, geologic, and anthropomorphic drivers. Stable carbon isotopic signatures of insoluble components of soil organic matter (SOM) reveal the impact of human occupation on vegetation regimes within the Rio Blanco watershed with $\delta^{13}\text{C}$ values of humins and humates reflecting a C3 dominated landscape prior to a rapid shift of up to 4‰ following the introduction of C4 crops (maize) to the region. Values remain at relatively less negative values through the Classic Period, declining only after the abandonment of nearby Maya polities.

Meredith, Clayton [162] see Thompson, Amy

Meredith, Maxwell (University of Glasgow)

[350] *Hitler's Fortress Builders: The Use of Nondestructive Testing to Quantify the Differential Treatment of Laborers on Second World War Alderney*

World War II left behind archaeological evidence of an impressive magnitude on the British Channel Islands, and today many of these features lay untouched. It was throughout my master's research at Glasgow University in 2013–2014 that I developed a project to enhance our archaeological understanding of these concrete relics. Using a specific set of methods, I was able to accurately and nondestructively test the compressive strength of several concrete features. Combining this raw data with the available historical material, I was able to show that features constructed by professional German engineers were markedly stronger when compared to features constructed by poorly treated conscript laborers from Eastern Europe and the Soviet Union. Overall, this discovery served as a means to quantify the extreme dichotomy in the living and working conditions of these labor classes, while simultaneously refining a methodology that could have important implications for historical archaeology.

[350] *Chair*

Merewether, Jamie [301] see Schleher, Kari

Merlo, Stefania [57] see Biagetti, Stefano

Merrett, Deborah C.

[115] *Timing of Stress Episodes at Houtaomuga: Neolithic and Bronze Age Comparisons*

The unworn and minimally worn anterior teeth of 48 individuals from Neolithic and Bronze Age levels of the Houtaomuga site in Jinlin Province, China were examined macro- and microscopically for location on the labial surface of lines of Enamel Hypoplasia relative to the cemento-enamel junction. From estimated ages of enamel formation across the tooth crown surface, ages of occurrence of stress exposure were calculated. Variation in timing of growth cessation and recovery from birth to six years, as recorded in the enamel of the anterior dentition, is explored within the cultural and environmental contexts of two distinct subsistence economies: the Neolithic based solely on hunting-gathering-fishing, the Bronze Age with millet cultivation added to the basic h/g/f economy. This study examines the bioarchaeology and life histories of young children across dimensions of time, environment and subsistence in Northeast China.

[115] *Chair*

Merrett, Deborah C. [115] see Zhang, Hua

Merriman, Christopher [162] see Meredith, Clayton

Merritt, Stephen (University of Alabama at Birmingham) and Kara Peters (College of William and Mary)

[152] *The Impact of Experience and Flake Attributes on Carcass Processing Time and Efficiency during Actualistic Early Stone Age Butchery*

Actualistic butchery often investigates the relationship between tool characteristics and butchery behavior but rarely considers individuals' butchery skill. Therefore idiosyncratic behavioral differences may confound analyses of butchery time or efficiency. Here, two novice butchers used replicated Oldowan flakes on 40 domestic goat limbs to examine how tool attributes affected processing time and efficiency during defleshing and disarticulation, and whether a learning curve impacted butchery performance as individuals gained experience. Neither butcher displayed significant temporal trends in defleshing efficiency (weight of meat defleshed per unit time) or disarticulation time (number of seconds required to separate joints) during the experimental series, however rank-order correlation indicates a significant positive trend in hindlimb defleshing efficiency through time for one individual. Two-way ANOVA shows hindlimbs were butchered more efficiently than forelimbs, but both butchers were similarly efficient. In contrast, disarticulation took significantly longer for one butcher, but forelimb and hindlimb disarticulation times were similar. Flake length, width, longest cutting edge length, and weight were positively related to defleshing efficiency, and negatively related to disarticulation time. Overall, bigger flakes were better for disarticulating limb joints and quickly removing meat, and these patterns were not obscured by increasing butchery experience. Supported by NSF awards 1358178 and 1358200.

Mesa Dávila, Silvia (Dirección de Registro Público de Monumentos y Zonas Arqueológicas y Históricas)

[328] *Legal Premises Involved in the Archaeological Registry*

The paper we present reveals the legal basis of the Mexican cultural heritage public registry and the consequences of the relation it sustain with its statements and academic interests involved in the description of archaeological materials. Accordingly, the real work begins of typology, chronology and cultural classification, associated with the sites and related archaeological materials, as well as, its preservation status. All this information is stored, organized and published, in a strong database system, also designed to provide indicators to enhance the policies for heritage protection, based on real data. It's important to stress the relevance of developing a systematic, homogeneous and standardized database designed, according to Registry Law parameters. This National Public Registry database is being inputted by curators and academic researcher contributions, ensuring certainty about archaeological goods, its amount, localization and academic assets for the future planning projects.

Mesia, Christian (Universidad San Ignacio de Loyola) and Sadie Weber (Harvard University)

[222] *Evidence of Diet and Food Consumption from Chavín de Huantar during the Middle and Late Andean Formative (1200–550 BCE)*

Excavations carried out at the Wacheqsa sector at Chavín de Huantar identified archaeological contexts from the Middle Formative (1200–900 cal BCE) and Late Formative (900–550 cal BCE). In this paper we present preliminary results of starch analysis carried on in culinary equipment (ceramics) retrieved from domestic occupations from the Middle and Late Formative periods and a large midden, originated from the discard of feasting remains during the Late Formative period. Microbotanical analysis performed on the ceramic assemblage retrieved in these spatial units revealed a variety of plant food resources. Two types of maize, wild grasses, chile peppers, and olluco were identified. Maize was overwhelmingly the most common taxon present, and some granules exhibited signs of grinding, boiling, and possibly fermentation, which could be indicative of chicha consumption within the Wacheqsa sector. This evidence may suggest patterns of consumption among the spatial units identified as well as vessel use specialization for food production, having at the same time implications in food procurement and resource management strategies.

Metcalfe, Jessica (University of British Columbia) and Vandy Bowyer (Athabasca University)

[339] *Bison Ecology and Precontact Human Land Use at the Promontory Caves*

Promontory people were proficient bison hunters with a sophisticated understanding of bison ecology. In contrast, modern researchers know relatively little about precontact bison ecology in the Great Basin. We combine botanical analysis of dung and isotopic analysis of various substrates (dung, hair, hide, bone) to reconstruct ancient landscapes and bison behavior during the Promontory occupation. Carbon isotope compositions indicate that a C3-dominated environment existed at the Promontory Caves during the Late Prehistoric human occupation, and botanical analysis provides evidence for the specific plant taxa present. Most bison procured by Promontory people consumed C3 diets. However, one sample of moccasin leather had an anomalously high $\delta^{13}\text{C}$ value, indicating significant C4/CAM plant consumption. Select specimens from Franktown Cave (Colorado) and Ross Rockshelter (Wyoming) also had unusually high $\delta^{13}\text{C}$, suggesting the possibility that occasional bison were procured on long-distance scouting expeditions or other forays to the south and east. We use isotopic and botanical evidence to evaluate this hypothesis and alternatives such as (1) trade, (2) occasional migration of bison from distant locations, and (3) atypical consumption of locally-available C4/CAM plants, perhaps during times of stress. We also discuss the implications of our data for hunting and land use among proto-Apachean groups.

Metz, Micca (Cardno)

[46] *After the War: An Analysis of the Mortality of American Soldiers from the Last Century*

This historical archaeological analysis examines differences in the age of mortality for U.S. Army personnel who fought for America in the last 100 years. This study centers on the historical data gathered from historic mortuary monuments and compare that data with contemporary mortuary monuments. Specifically, I focus on the timing of death for returning veterans and the increased occurrence over time and by war, as reported by Veterans Affairs (2016). The data are separated by years of service, following major wars or known conflicts where American Army personnel were engaged, looking for a trend in (a) which conflict produced the most post war casualties, (b) the number of years following the end of the conflict when the deceased died, and (c) the age of the soldier at their time of death. This investigation examines the pattern of altered mortality during the last 100 years of Seattle-based soldiers.

Meyer, Dominique (University of California, San Diego), Eric Lo (University of California, San Diego), Sabrina Trinh (University of California, San Diego), Emily Zheng (University of California, San Diego) and Falko Kuester (University of California, San Diego)

[29] *The Rapid Generation and Visualization of 3D Timelapse Reconstructions of the Excavation at the Paleolithic Site Arma Veirana in Italy*

Arma Veirana is a Middle/Upper Paleolithic cave site of the Maritime Alps of Liguria, Italy, which has the potential to offer insight into the interaction between Modern Humans and the Neanderthals. Preliminary excavations have shown a continuous occupation between the Middle and Upper Paleolithic time periods, yet the complexity of the cave morphology and geology have made it difficult to isolate erosion as well as environmental and non-natural factors to understand the full image of hominin interaction and prehistoric life. In this paper, we propose a novel method to rapidly combine and visualize timelapsed photogrammetric and LIDAR data of the cave excavations. This method enables archaeologists to evaluate and analyze the layers and artifacts of the excavation within the context of the cave. Through a better understanding and visualization of the cave excavation over time, it is expected that this method will further link micro and macro factors of the site, which would otherwise not have been as apparent.

Meyer, Jack [294] see Younie, Angela

Meyer, Jana (University of Bonn, University of New Mexico)

[192] *Examining Variable Funerary Practices at Pottery Mound, New Mexico*

Pottery Mound (LA 416) is a Pueblo IV village site located on the Rio Puerco in central New Mexico southwest of the modern city of Albuquerque and was occupied from the mid-fourteenth to mid-fifteenth centuries. This site is most notable for its abundance of local and nonlocal ceramic types and elaborate kiva murals (Schaafsma 2007). Excavations at Pottery Mound took place during several University of New Mexico (UNM) field schools under direction of Frank Hibben and later Linda Cordell between the 1950s and 1970s. The recovered skeletal sample, curated at the Laboratory of Human Osteology (Maxwell Museum of Anthropology, UNM) comprises about 175 individuals of all ages, which exhibit evidence of a variety of different funerary practices which remain poorly understood. This study examines the Pottery Mound osteological collection for biological information (including age, sex, and pathology) and taphonomic evidence of mortuary practice. These data are then compared to the archaeological context the burials were discovered in such as provenience, orientation, position, and affiliated funerary objects. Then both archaeological and osteological data are analyzed for patterns to address potential biological and/or cultural factors that may explain the variability in funerary practices in Pottery Mound.

Meyer-Lorey, Robin (UCLA)

[355] *Economic Intensification in Old Kiyangan: Global Interaction and Intra-regional Trade Understood through Trade Ceramics*

Access to imported goods by premodern societies implies economic intensification and long distance trade and interaction. Investigations in the Old Kiyangan Village (OKV), Ifugao, Philippines, have indicated that Southeast Asian and Chinese tradeware ceramics began to influence social interactions as early as 600 years ago. This presentation reports on our work in OKV that highlights the role of outside trade in the development of social differentiation in the region. We focus on the period before and during Spanish contact in the Philippines, drawing materials from around the end of the thirteenth century to circa AD 1800. Spatial and temporal analysis of tradeware ceramics (stoneware and porcelain) in Old Kiyangan Village can advance our understanding of the availability of these prestige trade ceramics to different members of the community as well as the role of the ceramics within the community. These insights reveal more about the ways in which individuals at OKV taking part in intra- and interregional trade networks may have consciously or unconsciously altered the availability and significance of prestige goods such as trade ceramics in their own community.

Meyers, Maureen (University of Mississippi)

[163] *Shell Bead Production at a Southern Appalachian Mississippian Frontier*

Frontier areas differ from non-frontier areas in multiple ways; one is by a more intense degree of interaction with other cultures. To successfully settle a frontier area, frontier groups must not just interact but also socially integrate with other groups. Craft production is one way social integration occurs. At the Middle Mississippian-period Carter Robinson site, there is evidence for the production of shell beads. This paper presents this evidence, which includes all stages of shell bead production, shell waste, drills, and flake tools, and discusses how shell bead production may have acted as an integrative mechanism at this Mississippian frontier.

Meza, Yarely [11] see Hankins, Sharon

Meza-Peñaloza, Abigail (Universidad Nacional Autónoma de México, IIA) and Yoko Sugiura (Universidad Nacional Autónoma de México, IIA)

[145] *Salud y adaptación al medio en San Mateo Atenco y Santa Cruz Atizapan (ca. 200–1000 dC)*

El estudio de la salud en el pasado utilizando restos óseos humanos está constreñido a una serie de limitantes, durante las exploraciones arqueológicas no se logran recuperar el total de los esqueletos que deberían representar a la población, sin embargo cada colección ósea representa un fragmento de la historia de vida de las personas que allí vivieron; se estima que un aproximado del 15 por ciento de los individuos presentan alguna señal de enfermedad, que bien puede ser de origen traumático, degenerativo, metabólico o infeccioso. En las últimas décadas ha surgido el interés por el desarrollo de técnicas moleculares que coadyuven en la identificación de los agentes infecciosos, sin embargo las condiciones de conservación de los materiales no siempre se prestan para este tipo de estudio de ahí que la paleopatología siga valiéndose del análisis morfooscópico para la identificación de las enfermedades en el pasado. En el presente trabajo nos dedicamos al análisis de las lesiones observadas en 82 individuos, 20 corresponden al sitio de San Mateo Atenco (SMA) y 62 a Santa Cruz Atizapán (SCAT) para tratar de recrear las condiciones de vida de los aldeanos asentados en las cienegas del Valle de Toluca.

Miao, Yunfa (Cold and Arid Regions Environmental and Engineering Institute, CAS), Heling Jin (Cold and Arid Regions Environmental and Engineering Institute) and Jianxin Cui (Shaanxi Normal University)

[33] *Human Activity Accelerating the Rapid Desertification of the Mu Us Sandy Lands, North China: Evidence from Micro-Charcoal Assemblages*
Over the past several thousand years, the arid and semiarid regions of China have experienced a series of asynchronous desertification events in its semiarid sandy and desert areas, but the precise identification of the driving forces of such events has remained elusive. Identified are two rapid desertification events (RDEs) at 4.6 ± 0.2 ka BP and 3.3 ± 0.2 ka BP from the JJ Profile, located in the eastern Mu Us Sandy Lands. These RDEs appear to have occurred immediately following periods marked by persistently frequent and intense fires based on the micro-charcoal assemblages. We argue that such fire patterns, directly linked to an uncontrolled human use of vegetation as fuel, played a key role in accelerating RDEs by ensuring that the land surface was degraded beyond the threshold required for rapid desertification. Today, the Mu Us Sandy Lands are an important agropastoral transition zone and a powerful ecologically-protective screen preventing the incursion of deserts from the south and east. According to this analysis, future major ecological rehabilitation should focus on improving vegetation coverage and avoiding fire hazards to reduce the risk of desertification. The micro-charcoal might be considered as an important proxy for investigating the fire process and ancient human activities.

[99] *Discussant*

Michael, Amy [185] see Bengtson, Jennifer

Michelaki, Kostalena [22] see Roddick, Andrew

Micheletti, George J. (University of Central Florida)

[369] *Ascendancy through Ancestry: Evidence of Late Classic Sociopolitical Change at the Ancient Maya Site of Pacbitun, Belize*
The ceremonial architecture of Pacbitun's epicentral plaza was recently discovered to have undergone a drastic early Late Classic (AD 550–700) transformation. The assemblage, originally designated as a Southern Lowland architectural archetype known as an E-Group complex, was uniquely modified physically and adopted an intensive mortuary practice that seemingly altered the group's function. The inclusion of several Late Classic elite interments suggests that Pacbitun's ceremonial assemblage had begun to function as another Southern Lowland archetype known as an eastern shrine. Continuing with this investigation, the next task would be to identify what this archetypal conversion might signify for the site. To do this, it will be important to understand what the E-Group and eastern shrine archetypes are thought to represent in Maya society. It will also be important to understand how the meaning of ancestor veneration evolved through time. This paper will detail the projected significance of both archetypes and explain the sociopolitical motivation behind placing ancestors into these structures. I plan to demonstrate that the conversion of Pacbitun's most time-honored, sacred monumental public work would have had tremendous communal and administrative ramifications and may suggest the site was experiencing sociopolitical change in the Late Classic.

[369] *Chair*

Micheletti, George J. [9] see Crow, Kaitlin

Michel-Morfin, Emilio [236] see Gomez-Gastelum, Luis

Mickel, Allison (Stanford University)

[37] *Agelash and the Powershot: Digital Possibilities for Alternate Ways of Knowing in Archaeology*
Digital recording methods offer a range of new means of collecting, organizing, and presenting archaeological information, which lead to new ways of thinking about the past. Capitalizing on the intuitive design of digital technologies additionally creates the potential for communities whose voices have been missing from the archaeological record to contribute their perspectives. In this paper, I draw upon my experiences experimenting with multimedia recording strategies at Petra, Jordan and at Catalhöyük, Turkey, in order to create opportunities for locally hired site workers on these projects to participate in excavation documentation. The photographs they created, especially, reveal ways of understanding the linkages between modern and ancient peoples, places, and objects that diverge from the normally assumed boundaries and relationships captured in archaeological recording. The affordances of digital technologies articulates with the specific archaeological expertise of site workers and the unique interpretive approaches of nonspecialist communities and gives rise to transformative ways of seeing and knowing the archaeological record. I will also discuss the limitations of the intuitive character of digital technologies, examining how the knowledge required to master these tools can work to exclude particular voices, though in different ways than previous recording technologies have done in the past.

Mickleburgh, Hayley

[92] *Modeling Skeletal Disarticulation: Using Actualistic and Comparative Taphonomy to Improve the Analysis and Interpretation of Human Burials*

Skeletal disarticulation patterns can be diagnostic of environmental conditions (e.g., water flow), animal behavior (e.g., scavenging), and/or human action (e.g., intentional displacement of bones), aiding the reconstruction of the events that formed a burial feature. In archaeoanthatology, a model of the "natural" or "common" sequence of disarticulation of the human skeleton at the joints has served as the basis to distinguish "natural" bone displacement from human intervention. This model is derived from archaeological observations and actualistic studies of animal taphonomy, and thus lacks verified actualistic data on human skeletal disarticulation. This paper discusses the preliminary findings of controlled, actualistic experiments in human decomposition and skeletal disarticulation, undertaken at the outdoor human decomposition facility of the Forensic Anthropology Center at Texas State University. This project aimed to document soft tissue decomposition and bone disarticulation in five willied donated human bodies. Displacement of the body (parts) and bones over time was captured and movements quantified using 3D photogrammetry. Ultimately, this research aims to assess the

existing model for the "common" sequence of human skeletal disarticulation. Ongoing research using a larger sample aims to investigate the potential effects of specific variables such as body mass, body position and mummification on joint disarticulation.

Mickleburgh, Hayley [69] see Mol, Angus

Migeon, Gérald [135] see Espinosa-Pesqueira, Manuel

Mihailovic, Dušan [181] see Dakovic, Gligor

Mikeska, Christine [144] see Huston, Melyssa

Milbrath, Susan (Florida Museum of Natural History)

[288] *From Flame to Flowers: Moths and Butterflies in the Codex Borgia Group*

Butterfly imagery in the Borgia Group shows how these volatiles were classified in Postclassic Central Mexico. They are grouped with birds among the 13 "lords of the day" in the Codex Borgia, and they sometimes seem to be interchangeable with moths, especially in imagery of the Fire God. Another god, Ehecatl-Quetzalcoatl, is associated with images of "army worms" devouring maize, symbolizing the caterpillar stage of a moth that distributes its eggs in the wind. Butterfly symbols are naturally linked with flowers that nourish butterflies. This is especially notable in representations of Xochiquetzal and Xochipilli, two deities who wear butterfly face paint and have names incorporating the word flower. Seasonal patterning is also evident in imagery of flowers and butterflies associated with the rainy season in a unique narrative section of the Codex Borgia.

[179] *Discussant*

Millaire, Jean-Francois [8] see Moreiras Reynaga, Diana

Millard, Andrew [30] see King, Charlotte

Miller, Bruce (University of British Columbia)

[334] *Sociocultural Anthropology's Engagement with Archaeology and Indigenous Frameworks*

As archaeologists seek out new ways to engage with Indigenous frameworks, people, and communities, sociocultural anthropology can engage and advance the conversation in several ways. Archaeologists and sociocultural anthropologists commonly work with the same communities, on the same issues, but on different time scales. Long term research with the Upper Skagit tribe of Washington State, undertaken collaboratively with archaeologists and community members, reveals sets of social tensions of considerable time depth. These include the relationship between stratification and egalitarianism; water and land; and centralization and isolation. These sets of irresolvable contradictions are seen in mythology, in ethnohistory, in the ground, and in contemporary social relations. These insights are only visible through the use of multiple methods that foreground indigenous frameworks.

Miller, Catherine (University of Wisconsin-Milwaukee), Russell Cutts (University of Georgia-Athens), David R. Braun (George Washington University) and J.W.K. Harris (Rutgers University)

[153] *Landscape Survey of Potential Combustion Features at FxJ20 Site Complex in Koobi Fora, Kenya*

Previous research in the Koobi Fora Formation, Marsabit District, Kenya identified nine delineated areas where the sediment was lithified and rubefied. These features derived from the excavation of the archaeological site of FxJ20-Main in the Lower Okote Member, which dates between 1.5 and 1.64 Ma. Previously, similar features in archaeological sites have been recovered with material that exhibit evidence of having been exposed to high temperatures. These features are discrete, isolated, circular, and noticeably different from surrounding tuffaceous silt. The goal of the current study was to complete a survey of the broader area around the FxJ20 site complex, known as Area 131 in the Koobi Fora Formation, to determine the frequency and distribution of reddened patches. Using spatial mapping techniques, including GIS and aerial photography, the distribution of these features were mapped on an ancient landscape. Twenty-five total potential combustion features were identified and associated artifacts and fossils were recovered at 12 of these. The spatial distribution of the potential features indicated possible environmental influences on location and clustering of the features. The frequency of these features distinguishes this area from other parts of the ancient landscape. IRES grants from the U.S. National Science Foundation supported this research.

Miller, Christopher [143] see Chala-Aldana, Döbereiner

Miller, D. Shane (Mississippi State University)

[286] *The Warfare Paradox, or All Quiet on the Western Tennessee Valley Archaic*

The complex hunter-gatherers of the Middle and Late Archaic periods in the Tennessee River Valley of the American Southeast are well-known for displaying evidence of intergroup violence, including scalping and trophy taking. On the other hand, these time periods are also known for the emergence of exchange networks centered on items including bone pins and bifaces. I argue that the co-occurrence of exchange networks and intergroup violence was likely the result of iterated "live and let live" or "tit for tat" strategy for coping with increasing demographic pressure.

Miller, Heather (University of Toronto)

[178] *Invisible Value: Steatite in the Faience Complexes of the Indus Valley Tradition*

Faience (composition, frit or siliceous paste) was widespread, special, and yet everyday across much of Eurasia for well over a millennium, yet hardly known today. These materials were made with many different recipes and production methods, but there is an unusual, apparently unique, variation in faience composition for some objects in the Indus. Some siliceous paste objects include steatite fragments, invisible on the surface and requiring laboratory analysis for detection. These could be production additions for strength or similar purposes, or they could relate to a different kind of materiality, either for religious meaning, as in some modern uses, or a symbol of Indus identity/unity, as in other uses of steatite during the Indus period.

Or all of these could be part of the value of steatite fragments, an important option to consider beyond the usual oppositional approach to production and use answers for material choices.

Miller, Hollis (Department of Anthropology, University of Washington), Erin Gamble (Department of Anthropology, University of Washington), Darryl Holman (Department of Anthropology, University of Washington) and Ben Fitzhugh (Department of Anthropology, University of Washington)
[144] *Statistically Limiting the Error Associated with Old Wood in Archaeological Dating: A Case Study from the Kuril Islands*

This paper introduces a method for probabilistically narrowing carbon 14 date ranges on wood charcoal samples by computing the likelihood of selecting a specific tree-age in a random sample of charcoal. Archaeologists and others often build chronologies on fragments of wood that are of unknown age prior to the death of the tree. Here we examine a way in which these sources of error could be mitigated through statistical analysis of tree growth rings. As a case study we analyze specific tree species represented in samples collected by the Kuril Biocomplexity Project.

Miller, Holly (University of Nottingham) and Naomi Sykes (University of Nottingham)

[284] *Theoretically Informed Isotope Analysis: Human-Animal Relationships at Fishbourne Roman Palace*

Stable isotope studies have become common-place in archaeological investigations of human diet and mobility, often underpinned by small comparative studies of associated animal remains which are generally utilized as baseline data. However, the value of moving beyond such anthropocentric studies and of analyzing animals in their own right is becoming increasingly recognized. Detailed research on animal diet and mobility is enhancing our understanding of animal management and patterns of procurement but there is scope to consider isotope data in more theoretically informed way, to examine broader issues of human-animal relationships in the past. To highlight the benefits of a human-animal studies approach to isotope analysis, this paper will present the results of an investigation focused on the high-status site of Fishbourne Roman Palace in England. It will explore how incorporation into the Roman Empire inspired new relationships between people, animals, and their environments.

Miller, James (Indiana University of Pennsylvania)

[260] *Porcelain and White Salt Glazed Stoneware at Hanna's Town*

Previous archaeological investigations at Hanna's Town have involved locating the homes within the town and locating the fort. My research involves analyzing Porcelain and White Salt Glazed Stoneware to determine if there is a spatial pattern across the site. This may shed light on wealth distribution at historic Hanna's Town. Detailed analysis of decorative motifs will also provide insight on trade patterns and economics of the colonial frontier in the late eighteenth century. Historic Hanna's Town, in existence from circa 1769 through 1790, was located near present day Greensburg, Pennsylvania. Hanna's Town, the first English county seat west of the Allegheny Mountains, rivaled Pittsburgh at the time, and included around 30 homes, a jail, and three taverns. In 1782 a combined British and Seneca force attacked and burned the town except for the fort and two structures. They also massacred livestock and targeted homesteads in the surrounding area. In 1969 the land was purchased by the Westmoreland Historical Society and archaeological investigations of the site began that year as well.

Miller, Kye (PaleoWest Archaeology)

[266] *Red Ware and Migration in the Northern San Juan Region: A View from Pit Structure Architectural Practice*

Previous researchers have proposed that early red ware traditions in southeast Utah (i.e., Abajo Red-on-orange) represent an intrusive practice in an area generally dominated by black-on-white ceramics. This red ware "intrusion" has previously been interpreted as possibly representing the in-migration of southern groups into southeast Utah and southwestern Colorado. Using the communities of practice approach, this paper characterizes pit structure architectural practice in relation to technological style in the northern San Juan region during the Basketmaker and early Pueblo periods to explore migration and social identity among early Pueblo residents of southeast Utah and southwestern Colorado.

[266] *Chair*

Miller, Mary

[391] *Technologies of Replication in Maya Figurines*

Among the class of Late Classic Maya figurines generally considered to be from the Island of Jaina, molds were used to form entire objects as well as individual body parts. Molds may also have been taken of one finished figurine in order to generate a new object that would be slightly larger than the original, sometimes resulting in cascading generations of related works. Production techniques of the ceramic mold may also have been deployed for individual body parts, particularly the human head. In this investigation the nature of assembly, the use of molds for both body parts and whole figurines, and the subtle differentiation of related works, will be evaluated.

Miller, Naomi (Univ of Pennsylvania Museum and ISAW)

[95] *Social and Spiritual Landscapes in Ancient Mesopotamia*

Ethnobiologists have demonstrated that shared human cognitive processes generate cross-cultural regularities in how people categorize the natural world. The human ability to recognize taxa means that plant and animal classification is not totally arbitrary. In addition, ancient people would have had place-specific knowledge of the particular plants and animals living in the territories they frequented. Representations of plants and animals in relation to each other in a landscape therefore reflect an understanding of the "natural" world, but the meaning of the compositions is not necessarily self-evident. Archaeobiological data, ancient texts, ethnographic analogies, and plant and animal morphology and distribution are brought to bear in the analysis of two iconic objects of ancient Mesopotamia, the Warka Vase and the so-called Ram in the Thicket. In both cases references to plants and animals set in a landscape can be read literally or metaphorically.

[275] *Discussant*

Miller, Paul R. M. (Federal University of Santa Catarina), Paola Cortez Bianchini (EMBRAPA Semiárido), Paola May Rebollar (UFSC and CESUSC), Marta Adriana Pedri (EPAGRI and ADM Terra Indígena Lã Klãnõ) and Luis Renato Nascimento (CNPq Scholar, Estúdio Cafundó)
[384] *"Bai Kui," the True Garden; "Ava-Ti," the White Population: Horticultural Intensification in Lowland South America*

The "true garden" or "Bai Kui" of the Kashinawá, Pano language speakers in the state of Acre, Brazil, is described here as an example of the original horticulture which occupied the arc of dry forests in southeastern Amazon. Improved forms of manioc, peanuts, and peppers evolved during 9,000 years of cultivation and were exchanged with farmers on the Pacific Coast to improve garden diversity in an ancient and far-flung cultural interaction sphere. The connectivity required for long-distance exchange of constantly evolving germplasm, explains the presence of these crops in the iconography of the Tello Obelisk. A second, more commoditized, form of horticulture based on maize and bitter manioc, is associated with Tupi-Guarani and Arawak speakers, who adopted and further developed a powerful form of maize breeding based on population genetics. This genetic system, here called "Ava-Ti," or "white population," uses color in maize kernels to control gene flow between distinct maize populations. Planting and harvesting short-cycled,

highly productive maize on fertile soils, and the storage and redistribution of cereal maize and bitter manioc flour, created new forms of territorial expansion during the last 3,000 years, eventually reaching the Andean foothills, southern Brazil, and the Caribbean islands.

Miller, Sarah

[224] *Heritage Monitoring Scouts (HMS Florida): Engaging the Public to Monitor Heritage at Risk*

Along Florida's 8,000 miles of shoreline, nearly 4,000 archaeological sites and over 600 recorded historic cemeteries are at risk from coastal erosion and rising sea levels. The matter remains complex in Florida where despite the 20% higher rate of sea level rise compared to the global average, "climate change" remains politically taboo. This paper will outline ongoing efforts to engage the public in monitoring coastal sites and the creation of the Heritage Monitoring Scout (HMS Florida) by the Florida Public Archaeology Network (FPAN) as well as discuss outcomes of the first annual "Tidally United: Cultural Resources Shoreline Monitoring and Public Engagement Summit" as FPAN plans for a second summit in June 2017.

[97] *Discussant*

Miller, Stephanie (University of California, Riverside)

[329] *The Ghost of Functionalism*

This paper considers the assumptions, limitations, and greater implications that a theory of integration-disintegration has for analyzing social change across space and time. It reviews the historical foundations of the concept of integration as it emerged in enlightenment social theory and considers how the concept of integration has been repeatedly and uncritically co-opted into various discourses of archaeological theory. An alternative framework for thinking about social change will be offered and the context of the Yaxuna-Coba causeway will serve as an example to illustrate the various strengths and weaknesses of these different approaches for positing possible pathways of economic development.

Miller Wolf, Katherine (Indiana University East)

[276] *Curating Large Skeletal Collections: An Example from the Ancient Maya Site of Copan, Honduras*

Bioarchaeologists draw data from the detailed study of human remains from archaeological contexts. The information embedded in the skeleton provides a powerful window into prehistory; informing us of past lifeways, health/disease, diet, kinship, migration, and conflict. The intimate relationship between the living and the dead is necessarily imbued with respect and an ethical responsibility to properly handle and curate the remains of those that we study. However, the conservation of skeletal collections may be hindered by a myriad of challenges at various scales including bureaucracy, unstable political climates, insufficient funding, missing field documentation, inadequate laboratory space, or a lack of basic necessities like storage containers or shelving units. Here, I will present the process and results of a decade-long project devoted to the conservation and re-housing of the Copan skeletal collection. The human remains curated at the Centro Regional de Investigaciones Antropológicas include more than 1,000 individuals excavated by various archaeological and rescue projects over the past 125 years. Special focus will be paid to the logistics of implementing a large-scale conservation project considering possible pitfalls and solutions, especially in a tropical climate. Finally, recommendations will be offered to prevent problems before they arise both in field and laboratory methodology.

[276] *Chair*

Miller Wolf, Katherine [276] see Quiroz, Carlos

Miller Wolf, Katherine [8] see Winstead, Seth

Millhauser, John K. (North Carolina State University) and Lisa Overholtzer (McGill University)

[209] *Mixed Metaphors and Mixed Media: Using Commodity Chains and Commodity Circuits to Better Understand Aztec Textile Production*

Archaeological and ethnohistoric investigations of Aztec textile production have shown how women's labor and domestic economies were interwoven with the imperial political economy. However, remarkably little attention has been paid to the people involved in affiliated industries—like cotton growers, dyers, and spindle-whorl-makers. Material evidence of these people is often ephemeral or isolated, but it is available. In this paper, we draw on theories of commodity chains and commodity circuits to unite these data and show why attention to these affiliated industries matters. The metaphor of the chain draws attention to the social and economic dependencies linking people along a production sequence: links that often correspond to physical places like markets, workshops, and farmlands. Commodity circuits draw attention to flows of goods that are nonlinear and multidirectional, to goods that intersect and are bundled together in these flows, and to the flexibility of the meaning and value of these goods. Applying these ideas to Aztec textile production expands our view beyond one segment of society, singular relationships, and finished products. These ideas also direct our attention to variation in terms of work and dependence among the individuals, households, communities, and regions that were linked together by textiles.

Millhauser, John K. [128] see Overholtzer, Lisa

Milligan, Jennifer (PaleoResearch Institute, Inc.), Linda Scott Cummings (PaleoResearch Institute, Inc.), R. A. Varney (PaleoResearch Institute, Inc.) and Gina Laurin (Denver Art Museum)

[191] *pXRF at the Museum: Nondestructive Elemental Composition Analysis of Collection Objects*

Applications for X-ray fluorescence Spectrometry as an analytical tool in anthropologically related disciplines continue to expand. Museum staff are charged with the amazing, yet daunting, task of housing, preserving, researching, and showcasing our most valued cultural treasures, and this versatile tool can help. As a nondestructive technique for investigating elemental-based aspects of material culture, handheld XRFs are an effective analytical option for museum collections. A handheld XRF was used to implement museum studies focusing on the presence of heavy metals such as arsenic, mercury, and lead associated with pesticides and elemental composition of pigments. Multiple collection methods were employed to identify elemental signatures from portions of non-homogeneous samples including ethnographic objects, paintings, furniture, and figurines. This poster highlights the resulting datasets with attention to semi-quantitative analysis of elements likely associated with poisons, as well as elemental presence/absence related to pigment composition and identification.

Milliken, Ian (Pima County, Arizona Cultural Resources & Historic Preservation Division), Jerome Hesse (SWCA Environmental Consultants), Suzanne Grisct (SWCA Environmental Consultants) and Doug Gann (Archaeology Southwest)

[59] *Tracking the Footprints of Early Agricultural Farmers in Tucson, Arizona*

Located at the confluence of the Rillito and Santa Cruz Rivers in Tucson, Arizona, archaeological excavations discovered an ancient agricultural field and canal irrigation system that contained human footprints belonging to an estimated 7 adults and 2 children, and 1 set of canine prints. These fields

and footprints date between 1000 and 500 BC. This exceptional discovery drew worldwide media attention and required an innovative and collaborative approach to data acquisition and interpretation. This paper provides information related to how the fields and footprints were discovered and the unique series of events that led to their remarkable preservation. We'll discuss the collaboration of multiple institutions to document and interpret the footprints within their context of the agricultural and canal irrigation system, using silicone casts of individual footprints, gait analysis, ingress to egress tracking analysis, 3D modeling, soil geochemistry and micropaleontological samples, and the results of the implemented analyses.

Milliken, Ian [366] see Rose, Courtney

Mills, Barbara (University of Arizona), Matt Peeples (Arizona State University), Jeffery Clark (Archaeology Southwest), Leslie Aragon (University of Arizona & Archaeology Southwest) and Thomas Windes (University of New Mexico)

[130] *"Mind the Gap": Social Networks and Chaco Migration Scenarios*

Migration plays an important role in archaeologists' reconstructions of the origins and development of Chaco society. Scenarios include migration from the northern San Juan to Chaco Canyon and other southern San Juan settlements in the ninth–tenth centuries; from Chaco to the central San Juan in the eleventh–twelfth centuries; and from the central San Juan to Chaco Canyon in the twelfth century. To evaluate possible migration pathways we compiled a database of 1.8 million ceramics from 340 Chacoan great houses and large-scale religious structures, and chipped stone from a subset of these buildings. We apply social network analysis to evaluate the dynamics of intersite relations from AD 800–1300 using a consistent method for dividing assemblages into 50-year intervals. We further assess the directionality and strength of ties by analyzing ceramic technological attributes—including carbon paint, smudging, slip color, and temper types—supplemented by lithic raw materials tied to subregional sources. Results indicate a prominent social gap between the southern and northern San Juan until the eleventh century; stronger and earlier ties of Chaco Canyon great houses to those south and west of the canyon; and the establishment of a prominent network pathway along the Great North Road in the early 1000s.

Mills, Barbara [130] see Dungan, Katherine

Milne, S. Brooke [22] see ten Bruggencate, Rachel

Milner, George [163] see Henry, Edward

Milosavljevic, Lisa

[246] *The Archaeologist's Guide to Visual Communications*

With visual technology becoming more affordable, archaeologists are more able than ever to engage in global dialogue with how research can help answer questions about our past and play a role into where we are going, while celebrating our shared lifeways that unite us as a human species. Pulling examples from the 2016 Quilcapampa Archaeological Investigation Project field season, this research report will share the different ways in which projects can incorporate a visual communications strategy through a variety of mediums from short documentary to social media.

Miltimore, Derek, Charles Perreault (ASU, School of Human Evolution and Social Change) and Jonathan Paige (ASU, School of Human Evolution and Social Change)

[91] *Comparing Traditional and Photogrammetric 3D Model-Based Measurements of Lithic Artifacts*

We assess how photogrammetry and three-dimensional (3D) model-based measurement approaches compare to traditional approaches of lithic analysis. Photogrammetry is a novel, inexpensive and accessible method of producing models of lithics. However, it is unclear how the rate of inter-observer measurement errors of 3D models produced through photogrammetry compares to that of traditional approaches. Here we analyze flakes from Salado period archaeological sites in the Tonto Basin, where interactions among villages and the production of lithic tools are well understood. Features of flakes are assessed using traditional qualitative assessments and caliper measurements. Then, the same flakes are analyzed using photogrammetry modeling software to produce a digital model of each artifact that allows for quantifiable characterization of minute details through data mining techniques. The reliability of both methods in terms of inter-observer accuracy, and in their ability to capture changes in knapping strategies within Tonto Basin are assessed statistically.

Minas, Kelly [300] see Perry, Jennifer

Minc, Leah [386] see Nation, Humberto

Minnis, Paul (University of Oklahoma) and Patricia Gilman (University of Oklahoma)

[84] *A Brief Introduction to the Sonoran Desert Fish*

While Suzanne and Paul Fish are endemic to the Sonoran Desert, they have been invasive in other regions of the World. The hybrid vigor from combining Paul's Michigan foundation with Suzy's Texas background added to their wide spread geographic range of experiences. As well, an enduring monogamy, not well-known for this species, contributes to their impressive contributions in archaeology. Here, we briefly explore the natural history of this unique team.

Minor, Elizabeth (Wellesley College)

[219] *One More for the Road: Beer, Sacrifice, and Commemoration in Ancient Nubian Burials of the Classic Kerma Period*

The funerary equipment of the Classic Kerma elite community included sets of ceramic vessels accompanying the primary deceased and sacrificed individuals. Stacks of beakers were placed in communal areas of graves, suggesting that the vessels were intended for group use in the afterlife. Graves with extraordinary organic preservation include woven giraffe-hair implements placed near the vessels. In comparison with ethnographic examples, these tools are beer strainers. Two graves also had vessels with preserved beer mash. Beer provided an important source of nutrition in Nubia, as in Egypt, and ancient Nubian beer is notable for containing natural tetracycline. The placement of communal beer vessels and drinking equipment in elite graves demonstrates the social nature of imbibing alcoholic beverages in the Classic Kerma culture. The beer stored in larger vessels was strained and then served to others in smaller beakers. This process of consumption acted to reinforce the social relationships between the participants. In death, these relationships were manifested through the coercion of individuals to be sacrificed to accompany the burial of the primary deceased individual. The

carefully arranged beer equipment was brought into the mortuary context, ready to be tapped to continue to commemorate these relationships in perpetuity.

Minor, Sophie (College of Wooster) and Paul Nick Kardulias (Academic Advisor)

[365] *One Site, Multiple Histories: A Study of the Numerous Phases of Habitations at Fort Caswell*

This study explores the archaeology of tourism through an examination of the multiple habitations of Fort Caswell, situated on the southwest coast of North Carolina. The brick fortification was built in the 1830s. Subsequently, it served as a U.S. Army installation from 1861 to 1945. The site has undergone extensive reconstruction due to its strategic geographic location at the mouth of the Cape Fear River, changes in function and ownership, and damages due to severe weather and war-related activities. The Baptist Assembly of North Carolina purchased the fort and its surrounding buildings in 1949, and since then has used the property as a retreat center and camp. Systematic excavation of the site since the early 2000s has produced a large assemblage of artifacts. The material retrieved during work at the fort includes items of very recent vintage. I discuss the importance of including artifacts from modern occupations in the consideration of the history of the site. Additionally, I consider the implications of excavations in which artifacts from recent habitation levels are regarded as trash and discuss how this behavior can dramatically change one's perception of an archaeological site.

Minturn, Penny

[41] *Planning for the Battle(field)*

The Defense POW/MIA Accounting Agency (DPAA) is tasked with recovering missing military personnel from conflict areas all around the world. In the past we have dealt most often with individual ground losses, expedient burials, and aircraft crashes. But soon we will be confronting the daunting, and very different, responsibility of the recovery of multiple individuals from battlefields. Battlefields differ from our "standard" excavation sites in many ways, namely, the number of casualties, the size of the site, the presence of enemy combatants, the length of time of battle, movement of troops, and complex formation processes during and since the battle. It will not be efficient or successful to approach these sites with previous recovery techniques. This paper lays out a recovery plan for approaching battlefield archaeology, given the unique constraints DPAA deals with, as well as highlighting the unique and vast resources from which we can draw.

Mintz, Eugenia [338] see Caracuta, Valentina

Miranda Tapia, Ivonne and Jorge Zambrana Fernández

[326] *Patrones Funerarios en 3 sitios del Departamento de Managua, Nicaragua*

En esta ponencia discutimos un hallazgo muy importante para la arqueología de Nicaragua, en lo que respecta a patrones funerarios del Período Tempisque terminal y posiblemente Bagaces inicial. El hallazgo fue realizado a 18 kilómetros al sur de la ciudad de Managua, el mismo comparte algunas similitudes con otros sitios de la ciudad de Managua, pero con notables diferencias en lo que respecta a ensamblajes cerámicos y al mismo tiempo en los patrones funerarios en sí, por ejemplo, en Ticuantepe, aparentemente se practicó el sacrificio humano en el cual la mujer debía acompañar al jefe o principal al más allá; en el sitio Los Martínez-La Chureca se practicaron dos patrones: el entierro primario y el de cremación; en el sitio Las Delicias, también en la costa del Lago de Managua a la altura del aeropuerto internacional A. C. Sandino el patrón practicado fue entierro primario y secundario. Todos del período Tempisque terminal y/o Bagaces Inicial.

Mirasol, Lauren M. [371] see Morales, Jessica

Mirro, Michael [386] see Spenard, Jon

Mischke, Steffen [389] see Sharon, Gonen

Miss, Christian [51] see Kopperl, Robert

Missal, Kele (University of Minnesota)

[88] *Reflectance Transformation Imaging: A Unique Approach for Imaging Use Wear on Obsidian Artifacts*

Use-wear analysts use various methods of imaging in order to identify patches of wear on stone tool surfaces. Obsidian, however, creates several imaging roadblocks for use-wear analysts who often depend upon light microscopy for their analyses. The integration of scanning electron microscopy (SEM) has allowed use-wear analysts to derive better image results from obsidian objects as it removes interference from color, surface reflectivity, and transparency. Yet SEM also has several drawbacks for use-wear analysts, namely cost of running the analysis and lengthy processing time. In recent years, Reflectance Transformation Imaging (RTI) has gained traction as an imaging method that can reduce interference from variables such as sheen and transparency. This makes RTI well suited for imaging obsidian artifacts. Use of RTI for identification of wear features remains relatively unexplored. RTI is a fast process that uses inexpensive components to produce high-quality, two-dimensional results. This poster presents preliminary results from a study designed to identify use wear on obsidian artifacts imaged via RTI. I demonstrate how RTI provides a potential complimentary imaging method that can be applied to problematic raw materials for the identification and analysis of wear features.

Miszaniec, Jason (Department of Anthropology, University of California, Davis)

[144] *A Millennium of Fishing: A Cross-Cultural Comparison of Faunal Remains from the Shaktoolik Airport Site (NOB-072), Norton Sound, Alaska*

Contemporary economic and subsistence fisheries are a significant resource in Norton Sound, Alaska. Artifacts and faunal remains recovered from test excavations at the Shaktoolik Airport site (NOB-072) demonstrate that indigenous peoples have been fishing in the region for at least the last millennium. We aim to trace the regional development of fishing strategies, and how they were influenced by demographic and climactic changes by comparing over ten thousand faunal remains collected in situ and from bulk soil samples from three discrete cultural occupations: 1) Thule/Nukleet, AD 1000–1400; 2) Yup'ik, AD 1400–1800, 3) Inupiat, AD 1800–1900. An analysis of early Thule assemblages will shed light on the development of Yup'ik coastal and riverine adaptations. Preliminary data indicate that fish counts as well as species-richness increased from early to late Yup'ik occupations and subsequently declined during the historic Inupiat habitation. Hunter-gatherer fishing economies represent a specialized subsistence strategy. The stability and predictability of fish is attributed to increases in populations as well as higher degrees of sedentism. Because of its technological investment and demographic implications, tracing the origins and development of fishing economies is of key interest in coastal archaeological research.

Mitchell, Juliette (University of Aberdeen) and Dave Cowley (Historic Environment Scotland)**[250]** *Using Multiple Techniques to Assess the Crop Marks of Early Medieval Barrow Cemeteries in Scotland*

This paper will show how using multiple techniques will refresh our understanding of crop mark sites, which is imperative for their protection and preservation. This work comes out of a research project looking at barrow cemeteries in north and east Scotland, the wealth of aerial archive was reviewed and explored through multiple methods. Rectifying and transcribing the aerial APs was one aspect, but ground survey picked up newly identified upstanding barrows at multiple sites. The results extend the time depth of the barrow landscape, and allow us to better understand this fragile archaeological resource.

Mitchell, Spencer [83] see Cortes-Rincon, Marisol

Mitchem, Alexandria [261] see Dawson, Emily

Mixter, David (Washington University in Saint Louis)**[67]** *Discussant***Miyamoto, Kazuo (Kyushu University)****[271]** *The Spread and Development of Iron Technologies in China*

Iron production in this paper is divided into two types; wrought iron and cast iron. Wrought iron was spread through the Eurasian grasslands to China two times; at the middle of second millennium BC and ninth to eighth century BC. At the later time, wrought iron daggers with golden or bronze handles spread to northwestern China. After wrought iron arrived in the Central Plains of China where bronze working was developed, there was the invention of cast iron technology. Development of cast iron technology of the Central Plains was accompanied by de-carburization to produce iron tools. On the other hand, in the Great Wall Region and the Eastern Tibetan Plateau wrought iron technology spread from the Eurasian grasslands. The diffusion route of wrought iron in these areas is affirmed by the chronology of the bimetallic dagger with a three pronged design. Wrought iron technology spread from northwestern China through the Eastern Tibetan Plateau to southwestern China. Finally, wrought iron technology spread to South-East Asia.

Mody, Zankhna (Trent University)**[214]** *Socio-Ecology and the Sacred: A Comparative Study of Historic Natural Sites in Tropical Asia*

Within the complex socio-ecological systems of South and Southeast Asia, ancient sacred natural sites were created by and imbued with cultural and ideological values; these were seen as liminal spaces or threshold environments. In this context, sacred natural sites act as transitional landscapes between the human and nonhuman worlds in ancient and modern times. This sub-project involves examining the roles of sacred natural sites in each of these three early state formations from 800–1400 CE: the Chola (South India), the Sinhalese (Sri Lanka) and the Khmer (Cambodia). Several ancient sacred natural sites around the world are active parts of societies today, and the ones chosen for this study span several categories, including sacred mountains, rivers, forests, and caves. Using the paradigms of entanglement theory and resilience theory, this sub-project analyzes the importance of sacred natural sites as socio-ecological integrative mechanisms within a comparative model of the Charter States present in South and Southeast Asia. The results of this transdisciplinary research can help inform us of the cultural factors and broader practices in the conservation of endangered natural sites and also provide more holistic alternatives to the problems of urban sprawl in the states of our contemporary globalized civilization.

Moe, Jeanne (Project Archaeology-BLM)**[97]** *Archaeological Inquiry and Integrating Science and Social Studies: A Research Opportunity*

Educators have long claimed that traditional school subjects should be integrated while archaeologists praise the ability of their discipline to bridge the divide between science, social studies, and many other subjects. While everyone seems to think that interdisciplinary teaching and learning is important and highly desirable, very little research has been conducted on students' conceptual understanding of the relationship between science and social studies. In a case study, I assessed students' understanding of interdisciplinary learning through archaeological inquiry and found that they were confused about the nature of both science and social studies and the relationship between the two. Additionally, I found that very little research on conceptual understanding of interdisciplinary science learning has ever been conducted. The preliminary findings from the case study and the lack of research point to a promising area for future research of prime relevance to archaeology education.

[97] *Chair*

Moe, Jeanne [97] see Alegria, Crystal

Moes, Elisa [263] see Peterson, Paige

Mohammed, Hend [43] see Pokotylo, David

Mohanty, Rabindra Kumar [324] see Smith, Monica

Moiseyev, Vyacheslav [330] see White, J. Alyssa

Mol, Angus, Hayley Mickleburgh (Leiden University) and Menno Hoogland**[69]** *Networks of the Dead: Exploring Patterns of Homogeneity and Diversity in the Precolonial Caribbean Using Network Analysis*

The precolonial Caribbean shows great diversity in burial patterns across time and space, making the interpretation of funerary behavior very complex. While some broad trends in funerary practices have been noted, a simple assessment of the frequency of different burial practices in the region reveals a range of body positions and body treatment, as well as burial location and grave goods. In this paper we use statistical and network explorative approaches to map these variable practices. A 2-mode network analysis will be used to visualize large-scale differences between various temporal and

regional divisions in the data-set. These overarching patterns will be further elucidated by a number of micro-networks centered on individual burials and their cross-connections. Our application of network approaches to funerary data bring to light some important considerations for assessing homogeneity and diversity in the funerary record, and showcases another avenue for network applications in archaeology.

[93] Moderator

Molano, Shaina (UC Merced) and Kimberly Munro (Louisiana State University)

[394] *Displays of Identity: A Community-Engaged Approach to Studying Identity through Photo Diaries*

This study is part of a larger research project, which looks at displays of social identity and the effects of influence from outside contemporaneous groups in precolumbian Peru. In studying past communities, we look beyond our own interpretations of "who" we perceived people to be and begin asking questions that reveal who they thought they were and how they chose to advertise that to those deemed "other." The nature of this research requires working closely with contemporary local communities who remain tied to their prehistoric landscapes and understanding the affects that may have on how they perceive themselves today. To this end, a community-engaged study on the advertisement of contemporary identities was conducted in the agropastoral town of Cosma, situated in the Cordillera Negra at the headwaters of a branch of the Nepeña Valley. Participants from the Cosma community created photo diaries during the 2016 field season, where they were able to take photos they believed best represented who they were within their community. This paper will present on the methods we utilized, the issues and problems we encountered, overarching themes represented in the photographs, and the preliminary results of this pilot study within the Cosma community.

Molist, Miquel (UAB/Spain), Josep Bosch (Museu de Gavà), Anna Gómez (UAB/Spain), Sílvia Calvo (UAB/Spain) and Mònica Borrell (Museu de Gavà)

[23] *The Variscite of Gavà, Spain: Characterization and System of Exploitation and Diffusion in the Northeast of the Iberian Peninsula*

This paper presents a synthesis regarding the exploitation of the variscite mineral in the prehistoric mines of Gavà, Spain, as well as the manufacturing of ornaments and their dissemination during the Neolithic period. Special emphasis will be given to the results of the latest research in both the mineralogical characterization and archaeological interpretations derived.

Mollenhauer, Jillian (Metropolitan State University of Denver)

[179] *Identifying the Quintessence of Olmec Centers in Formative Olman*

In the early twentieth century, the discovery of the Olmec colossal heads associated with San Lorenzo, La Venta, and Tres Zapotes led to the early designation of these three sites as the triadic centers of Olmec civilization, implying a level of cultural uniformity. Subsequent archaeological investigation has shown that the three centers, each with a distinct but overlapping chronology, share few commonalities in layout, artifact assemblage, or sculpture style. Indeed, the heads themselves demonstrate distinctive regional styles and configurations of display, underlining the many differences between the primary centers of the Olmec heartland. Given these disparities, is it possible to speak of the quintessential Olmec site? What clues might remain to signal those aspects of Olmec places considered most cherished or significant by their ancient inhabitants? This paper will explore the construction of Olmec landscapes in relation to regional geographies—specifically places of convergence, emergence, and hierophany. Rather than a single site serving as a model for other Olmec centers, the Olmec quintessential place is suggested by the way all three Olmec centers engaged with regional topography through practices of gathering, rituals of pilgrimage and deposition, tensions between the seen and unseen, and manifestations of the animate landscape.

[179] Chair

Mollerud, Katy (Peabody Museum of Archaeology and Ethnology)

[102] *A Comparative Ceramic Analysis of Motifs from Three Sites in the Cambria Locality, Minnesota*

The Cambria phase (AD 1050–1300) is an archaeological complex primarily centered on the elevated terraces of the Minnesota River in south-central Minnesota. Cambria phase pottery demonstrates technical and stylistic influences from several different late prehistoric cultural traditions, including Mississippian, Plains Village and Late Woodland. Cambria ceramics are currently classified as part of the Initial Middle Missouri Variant, but certain affinities are evident between the grit-tempered, rolled rim ceramics of the Cambria phase and the Powell-Ramey series at the Middle Mississippian site of Cahokia in west-central Illinois. However, the nature and degree of the relationship between these cultural areas has never been defined clearly. In order to identify the range of variation within Cambria ceramics, a comparative attribute analysis was completed using ceramic assemblages from the Cambria, Price and Owen D. Jones sites, which are collectively referred to as the Cambria Locality. This paper presents the results of a motif analysis that categorized individual design elements and identified four design field patterns. The results are interpreted at multiple levels of analysis, but primarily are focused on contextualizing intersite motif and design field variation in a micro-regional context within southern Minnesota. In addition, possible extra-regional origins of certain motif packages are discussed.

Monaco, Marci [91] see Johnson, Meghan

Monaco-Schlater, Joanna (Foothill College), Lawrence Conyers (University of Denver), Sean McConnel (University of Wisconsin-Milwaukee) and Andrew Bair (Columbia University)

[350] *Interpreting a Deserted Medieval Village through Geophysical Data*

Ground-penetrating radar is often used as a way to collect from reflections from buried features, which are then processed into colorized horizontal amplitude maps to visualize these features in the horizontal plane. While this is a good way find and visualized features in "batch mode" there are other less commonly employed methods to process the data. The Castles in Communities project in Ballintubber, Ireland, project has collected GPR datasets from multiple years to produce standard GPR images, integrated with magnetic gradiometer maps and three-dimensional isosurface renderings. In this way very different types of features, both architectural and agricultural are visible in large areas outside the castle walls. This shows where the medieval village was located, as well as other associated structures and agricultural fields. In addition within the castle walls a number of buildings, a church and other work areas, now totally invisible on the surface, have been identified. A number of these archaeological features have been excavated to confirm and refine the geophysical results.

Mongeló, Guilherme [327] see Watling, Jennifer

Monks, Gregory (University of Manitoba)

[378] *Conceptual Frameworks for Nuu-chah-nulth Whaling*

The Nuu-chah-nulth (Nootka) of Canada's west coast are renowned ethnographically for their cultural practice of open ocean whaling. Research in the last decade has shed light on the preferred species, the ecological reasons why whales were pursued, the antiquity of whaling, and the economic and social implications of whaling. Most of this research has been substantive and methodological in nature with only modest attention to theoretical issues. In this paper, I take a Human Behavioral Ecology perspective on Nuu-chah-nulth whaling and offer analyses of the practice from both optimal foraging and costly signaling perspectives. I conclude that these perspectives are complementary and provide a more complete understanding of the practice than would one or the other perspective alone.

Monroe, Cara (University of Oklahoma-LMAMR), Fernando Villanea (Washington State University-School of Biological), Eric Lenci Jr. (Muwekma Ohlone Tribe), Alan Leventhal (San Jose State University-School of Social Scien) and Rosemary Cambra (Muwekma Ohlone Tribe)
[92]

Ancient Human DNA Analysis from Central California: Interpreting the Penutian Migration through Genetics.
Mitochondrial DNA (mtDNA) data was collected from over 300 individuals to further understand the hypothesized spread of Penutian populations from the Columbian Plateau into Central California around 5,000 BP. While living and ethnographic Ohlone groups—specifically in the San Francisco Bay area—speak Penutian languages, it is unclear what effect immigrating Penutians speakers had on existing Hokan populations between 2500–3000 BP. Distinct maternal lineages that belong to either immigrating Pro-Utian speaking peoples, or to Hokan populations who lived in the area for more than 7,000 years, have been identified and indicates intermarriage post-migration. Bayesian analysis further suggests a major population expansion within the region.

Monson, Vanessa (University of Colorado Boulder) and Jeffrey Brzezinski (University of Colorado Boulder)

[82] *Whole Vessel Caches: A Comparison of Offerings at Cerro de la Virgen with Lower Río Verde Valley Public Space Offerings*
Previous archaeological excavations in the lower Río Verde Valley in Oaxaca, Mexico, have provided evidence for communal ceremonies since the Late Formative (400–150 BCE). The Terminal Formative (150 BCE–250 CE) period saw a continuation of communal ceremonies at hinterland sites along with the emergence of the region's first polity, Río Viejo. The maintenance of these practices in the hinterland during the increasing urbanization occurring at Río Viejo suggests their importance in community identity. These ceremonies included mortuary rituals, feasting, and public offerings. This presentation will focus on public offerings primarily by presenting data from Cerro de la Virgen, one of several secondary centers. Three seasons of fieldwork at Cerro de la Virgen have demonstrated a marked affinity for the emplacement of offerings, especially whole vessels, on a scale not seen in other secondary centers in the lower Río Verde Valley. The data from Cerro de la Virgen will then be compared with public offerings at other secondary sites in the region.

Monteleone, Kelly (University of Calgary/Mount Royal University), Andrew Wickeret (Department of Earth Sciences, University of Minnes) and E. James Dixon (Maxwell Museum of Anthropology, University of New Mexico)

[48] *Underwater Archaeological Surveys in Shakan Bay, Southeast Alaska*
The coastline of southeast Alaska was submerged by post-Pleistocene sea level rise from at least 16,000 cal BP until it stabilized about 10,600 cal BP. The submerged continental shelf was modeled using bathymetry and other data to identify areas exhibiting high potential for the occurrence of archaeological sites. Two seasons of underwater archaeological survey have been conducted at this location (NSF OPP #0703980 and 1108367), using multibeam sonar, side-scan sonar, sub-bottom profiler, real time video from remotely operated vehicle (ROV), and sea floor sampling using a van vein grab sampler and sediment screening. This data has produced a detailed overview of Shakan Bay, located on the northwest corner of Prince of Wales Island.

Montenegro, Alvaro and Scott M. Fitzpatrick

[296] *Environmental Influences on the Prehistoric Movement of Modern Humans through Wallacea*
Archaeological evidence for early population dispersals from Sunda to Sahul extends back to at least 50 kya in Australia and between 42–40 kya in Timor-Leste and Sulawesi. An increasing number of sites dating to between ca. 41–14 kya on these and other islands such as Halmahera suggest that modern humans were becoming more proficient and spatially expansive than once believed. What were the prime variables environmentally, socially, or climatically that may have influenced these movements during the Late Pleistocene? In this paper, we examine how and why these groups dispersed across this region during different intervals of time, taking into consideration the presence of now-submerged islands, winds, currents, and climatic (seasonal and other variability) processes. The results have implications for modeling colonization routes and estimating seafaring capabilities during the initial stages of Sahul occupation.

Montero Mejía, Gabriela (Universidad Veracruzana) and Marcie Venter (Murray State University)

[320] *Paradox No More? Postclassic Mazapa and its Regional Context*
During the 2014 through 2016 field and laboratory seasons of the RRATZ Project, the archaeological site of Mazapa was recorded, mapped, and its pottery and obsidian artifacts analyzed. These efforts reveal that Mazapa, located near Chonegal, Veracruz, is one of the largest Late Postclassic sites known for the southern Gulf lowlands; it contains approximately 170 structures that range from low housemounds to platforms measuring 7 m high. Although sizeable Postclassic settlements have been documented for the western Tuxtlas to the immediate southeast, and the Mixtequilla region to the northwest, only ephemeral contemporary occupations had been previously identified in this intermediate region. Preliminary understandings of the site suggest that it shared features with both adjacent regions. Landform modifications around the periphery of the site core may have given it a defensive advantage characteristic of its contemporaries in the uplands, its ceramic assemblage shares greater affinities with sites to the west (despite differences based on local clays), and obsidian materials reflect broad temporal trends of the Late Postclassic. This paper presents the results of field and laboratory investigations, and comments on the impact this new information has for the regional Postclassic archaeological context of the broader southern Gulf lowlands.

Montgomery, Shane (University of Central Florida) and Jaime Awe (Northern Arizona University)

[243] *Beneath the Blue-Green Trees: Understanding the Built Environment of Yaxox through Lidar Analysis*
The Upper Belize River Valley hosted a high density of ancient Maya settlement from the Early Preclassic Period onward, supported by abundant fertile alluvial floodplains. In addition to the handful of major civic-ceremonial centers spread along the valley, the region also sustained numerous middle-tier administrative, ceremonial, and residential loci. The site of Yaxox, strategically situated at the confluence of the Macal and Mopan rivers, provides an intriguing example of a minor civic-ceremonial locale. Despite the perceived minimal nature of the center, Yaxox features certain architectural elements—such as sacheob, reservoirs, and a ball court—commonly attributable to larger polities within the valley. Although the site remains understudied, the acquisition of aerial lidar for the region in 2014 allows for the remote analysis of the middle-tier center and its associated built environment. This paper focuses on the utilization of spatial information to analyze the natural landforms and archaeological landscapes surrounding Yaxox. These data will aid in the determination of the relative chronology, role, function, and extent of the site and provide a deeper understanding of the relationship between the middle-tier loci and other, larger surrounding centers such as Cahal Pech, Buenavista del Cayo, and Baking Pot.

Montgomery, Lindsay (University of Arizona)**[334]** *Multivocal Landscapes: Mapping Mobile Ontologies onto the Northern Rio Grande*

Forming a strategic corridor from the Southwest to the Plains, New Mexico's northern frontier was an important site of cross-cultural interaction during the colonial period. It was on the fringes of the Spanish Empire that Hispano, Pueblo, Ute, Apache, and Comanche groups converged, generating new cultural identities and materials in the process. While archaeologists have long been interested in the particular ways in which Pueblo groups conceptualized and marked this region, the rich and diverse ways in which mobile groups have engaged with the Rio Grande landscape is less well-known. Through a discussion of the archaeological remains of Ute, Apache, and Comanche groups I will explore the unique ways in which mobile groups make and mark space. Structuring this discussion is the belief that movement is the essential thread which binds together the social, economic, and spiritual worlds of mobile societies both in the past and in the present. As an indigenous ontology, mobility has important implications for how we as archaeologists interpret spaces, places, and things.

Montúfar López, Aurora (Instituto Nacional de Antropología e Historia)**[174]** *Rain Petition Rituals and Offerings in Mesoamerica: Archaeological and Ethnographic Research*

This paper examines two ritual expressions: the offering 102 of the Aztec Great Temple of Tenochtitlan (1436–1502) and the “promise” to the Santa Cruz or rain petition ceremony in Temalacatzingo, Guerrero, Mexico (2007, 2008, and 2010). It analyzes the consumption of botanical materials, such as copal resin, amaranth seeds, ahuehuete branches, yauhtli flowers, guajes and beans in both rituals. It identifies similarities in the way those materials were used, and proposes that this fact demonstrates cultural continuities in religious life of ancient and contemporary nahua peoples of central Mexico. It argues that both ritual expressions rendered worship to rainy and fertility goddess: Tláloc and Tlatoque in the past, Santa Cruz in the present. In this context, the botanical materials functioned not only as presents to the deities but also as representations of the natural factors (mountains, rivers, land and clouds) related to fertility in Mesoamerican religious tradition. The cultural continuities are explained as a consequence of persistence of agriculture of temporary, especially maize production, as the main economic activity, and the survival of ancient religious ideas and symbols.

Monz, Lauren [62] see Penfil, Rachael

Moonkham, Piyawit**[198]** *Mythscape: An Ethnohistorical Archaeology of Space and Narrative in the Northern Thai Cultural Landscapes*

A thousand-year-old narrative of the Naga in northern Thailand relates how the town known as Yonok came to be destroyed (by an earthquake) after its ruler became unrighteous. Regardless of this divine retribution, the people of the town chose to rebuild. Local chronicles and written documents show that people in the region continue to practice and believe in the narrative today. The Naga is seen as the guardian of the land. It is also seen as the creator and protector of rivers, lands, villages, and towns. In addition, there are more than a hundred archaeological sites spread throughout the Yonok ancient town indicate that people remained and revived settlements after the earthquake. This paper argues that the Naga myth is an agentive source for people to initiate action and performance. The myth is also used as referential knowledge by local people to modify physical landscapes, and guide their decisions over what might be called a mythscape, the ways in which people have learned to understand and interact with the surrounding environment. Mythscape is also a tool by which people act and reimagine their space as communal monumentality.

Moore, Christopher (University of Indianapolis)**[163]** *Interacting in Cramped Spaces: Material Culture and Identity at the Mission San Joseph de Sapala*

Accounts by sixteenth- and seventeenth-century explorers, missionaries, and government officials clearly illustrate the considerable amount of variability in indigenous cultures, ethnicities, and traditions found throughout the Southeast at contact. Beginning in the mid-seventeenth century, many of these formerly dispersed groups began to coalesce around mission communities in modern Georgia and Florida. The historical narrative of the contraction and eventual destruction of the Spanish mission system in Florida describes numerous towns and communities from the mainland aggregating for a time on Sapelo Island, the site of the Mission San Joseph de Sapala. This paper investigates Mission period ceramic variability in an effort to evaluate the degree to which interactions in mission communities is reflected in the diversity of ceramic attributes.

[163] *Chair*

Moore, David [160] see Rodning, Christopher

Moore, Jerry D. (CSU Dominguez Hills)**[217]** *Discussant***Moore, Summer (College of William & Mary)****[19]** *What's in a Dress? An Archaeological Collection of Kapa Cloth from Nineteenth-Century Nu'alolo Kai, Kaua'i Island, Hawai'i*

Anthropological discussions of gender and sexuality in colonial-era Polynesia have often focused on the introduction of Western clothing styles and the relationship between changing modes of dress and the negotiation of new social identities. Because clothing is highly perishable, however, there have been few opportunities to address this topic through the archaeological record. My paper presents an analysis of an exceptionally well-preserved collection of archaeological cloth from Nu'alolo Kai, Kaua'i Island, Hawai'i. This collection contains fragments of imported fabric and Hawaiian barkcloth or kapa from a site occupied until approximately 1850. Kapa and foreign cloth were found together in the site's uppermost layers. One remarkable piece of painted kapa was sewn into a sleeve, possibly as part of a missionary-style dress. This paper suggests that the introduction of new styles of dress in Hawai'i was more complex than is often understood. While Hawaiians at early nineteenth-century Nu'alolo Kai may have incorporated Western clothing into their daily routines, they also continued to make and use kapa. In fact, kapa manufacture, particularly the incorporation of foreign elements, may have served as one way for kapa makers to negotiate local systems of meaning in an environment of rapid social and cultural change.

Moore, Tom (Durham University, UK)**[20]** *Beyond Iron Age "Towns": Examining Oppida as Examples of Megasites and Low-Density Urbanism*

The question of whether Late Iron Age oppida in Europe were truly “urban” has dominated debate over these sites since the nineteenth century. Oppida, however, have been surprisingly absent from comparative urban studies, despite increasingly nuanced perspectives on the nature and diversity of the urban phenomenon. In particular, Roland Fletcher's suggestion that oppida might be examples of a range of alternative urban-like centers has been largely ignored by scholars of the European Iron Age. The increasingly complex nature of many oppida makes it a pertinent time to assess Fletcher's

claims and examine whether oppida can be compared to low-density urbanism elsewhere in the world. Using specific case studies, this paper argues that oppida do indeed share characteristics of low-density urbanism and that this is likely to be due to the negotiated nature of power in Iron Age societies.

Moots, Hannah (Stanford University)

[348] *Using Archaeological and Genomic Data to Investigate the Evolutionary History of Celiac Disease*

The Neolithic Transition brought with it a number of changes in the relationships that people had with animals, plants and pathogens. Increasing proximity to domesticated and commensal animals, and larger, denser communities shifted the disease ecologies of these communities and resulted in an increasing number of disease vectors. I use ancient and modern DNA to look at the effects that these new dietary and epidemiological trends had on people in the past and the genomic legacies of the Neolithic Transition today. This talk will focus specifically on Celiac Disease, an autoimmune disease resulting in life-long gluten-sensitivity. It is estimated that between 1 in 100 and 1 in 300 people worldwide live with this disease, which, if untreated may result in gastrointestinal and central nervous system stress and iron deficiency anemia. While clinical and global health efforts have increased awareness, diagnosis and treatment, many questions remain about the evolutionary history of this disease. Combining archaeological and genomic data can begin to address questions about the history of Celiac Disease.

[348] *Chair*

Mora, Santiago

[270] *Sedentism and Plant Domestication: Northwest Amazonia*

Two different scenarios have been proposed to explain sedentarization and the transition from foraging to sedentary societies. In the first a key resource or a combination of resources allows the stability of the population giving rise, over time, to sedentarization; in the second, a population concentration caused by an external change such as drastic climatic fluctuation or regional population increase with its concomitant social problems force the adoption of a sedentary way of life. In these scenarios plant domestication and the adoption of agriculture has been underlined; a good example of this is the interpretations of the archaeological record of the Levant. Yet, while Amazonian paleobotanical record shows a robust processes of plant domestication and plant experimentation, the archaeological record, particularly in the northwest Amazon, is very poor in examples of early sedentism associated with the adoption of agriculture. This paper explores the relationship between plant domestication and sedentarization in Amazonia.

Moralejo, Reinaldo (CONICET-Argentina, División Arqueología, Museo de La Plata, UNLP) and Diego Gobbo (CONICET-Argentina, División Arqueología, Museo de)

[56] *Mobility Network in El Shincal de Quimivil (Londres, Catamarca, Northwest Argentina)*

The use of Geographic Information Systems (GIS) allows analyzing the space as an integral part of any social phenomenon and produce interdisciplinary explanatory models with quantifiable basis. As it is known, the spatial organization of the Incas was structured under certain political and religious principles materialized in the landscape through various features such as rocks, water bodies, mountains, celestial bodies, plazas, ushnus, roads, and kanchas, among others. In the case of the Inca site El Shincal de Quimivil, located in the province of Catamarca (northwest Argentina), studies have shown the fundamental role of the Qhapaq Ñan or main road as a space organizer. Given the importance of the road as the axis of communication and integration, we intend to analyze the internal communication network of the various archaeological site structures in relation to the main road. We will use a GIS software to perform different analysis of accessibility according to the cost map produced for the site. This model of internal mobility allow us to understand different processes related to administrative and ceremonial political activities performed in El Shincal de Quimivil.

Morales, Alejandro (Investigador independiente), Gerardo Gutiérrez (University of Colorado Boulder), Michelle Goman (Sonoma State University), Israel Hinojosa-Balino (Durham/Ciesas) and Mary E. Pye (New World Archaeological Foundation)

[306] *Excavations in Cacalotepexi Cave, Chiepetlan: Paleoindian Enigma and Late Postclassic-Early Colonial Transition*

Cacalotepexi Cave, located near the town of Chiepetlan, is notable for its depictions of what appear to be deer being chased by humans done in white paint. Excavations in the cave uncovered evidence of use in the Late Postclassic-Early Colonial periods. An unexpected find at the back of the cave was an enigmatic deposit of calcium carbonate filled with chert debitage and animal bones, which returned radiocarbon dates around 9800 cal BC.

Morales, Jessica (California Coastal Archaeology Lab.; California State University, Los Angeles), Lauren M. Mirasol (CCAL, California State University, Los Angeles), Amira F. Ainis (Department of Anthropology, University of Oregon) and René L. Vellanoweth (Department of Anthropology, California State Unive)

[371] *Land Snails and Archaeology on the California Channel Islands*

Land snails have the potential to address a variety of archaeological concerns, including the identification of paleolandscapes and paleoclimatic conditions. Such studies demonstrate how non-marine mollusks can be employed to infer changes such as seasonal and long-term precipitation rates and anthropogenic landscape alterations. Although land snails are abundant in Channel Island sites, they are often ignored. In this paper, we utilize land snail remains from three archaeological sites on San Nicolas Island and a rockshelter site on San Miguel Island to address specific questions about past human activities and settlement patterns throughout the Holocene. Multiple land snail taxa including *Micrarionta opuntia*, *Helminthoglypta ayresiana*, and *Xerorionta* sp. were identified and quantified in this study. Our results suggest that land snails can be used to clarify stratigraphic ambiguities in the archaeological record, especially patterns caused by short-term occupation/abandonment cycles. Furthermore, our study suggests that the native people of San Nicolas Island incorporated land snails into their ritualized activities and ceremonial events.

Morales, Juan Julio [164] see Maldonado, Blanca

Morales, Montserrat and Edsel Rafael Robles Martínez (Instituto Nacional de Antropología e Historia)

[225] *Mammals in a Colonial Context*

The archaeozoological studies about secondary contexts (dumps and construction fills) are important as they explain the customs of the people in a particular time. These studies, normally, are excluded from the archaeological studies as funerary offerings, burials, activity areas, and so on, are the aim study of the archaeology. Moreover, the secondary contexts, as they are not related to systemic contexts, are considered informatively poor. We studied the faunal remains of a Mexican colonial dump and we performed a taphonomic analysis in order to rebuild the life history of the faunal remains. So far, 10 species of mammals were identified from 4,564 studied bone remains. Most bone fragments belong to ribs, followed by humerus and femur. According to the results, people during the Colonial age ate meat of big mammals like sheep and cow, which were brought by Spaniards, and local animals like deer, hare, and rabbit. The taphonomic analysis showed the animals were stewed and boiled.

Moran, Kimberlee S. (Forensic Outreach)**[14]** *Searching for Standards: Federal Efforts Regarding Crime Scene Investigation with Input from Archaeology*

In 2009 the National Research Council released a damning report on the state of forensic science in the United States. The end result has been a six-year mission to develop national standards and best practice for the myriad of forensic specialties. Coordinated by the National Institute for Standards and Technology (NIST), scientific working groups (SWGs) brought together practitioners, academics, and other stakeholders from around the country to draft documents outlining standard terminology and operating procedures. Despite stalled legislation, a national Forensic Science Standards Board was established in 2013 and it was announced that the SWGs would be dissolved and reformed as the Organization of Scientific Area Committees (OSACs). The aim of the OSACs is to, once-and-for-all, create the standards for their disciplines. While many forensic fields have a well-established history within the SWGs and now OSACs, crime scene investigation has traditionally been overlooked in the quest for standards. Finally, in 2015, over a year after the formation of the OSACs, NIST announced the formation of a CSI OSAC that included two members from the archaeology community. This presentation will provide an update on the progress of the CSI OSAC and the road ahead.

[14] *Chair*

Moran, Kimberlee S. [14] see Mower, Courtney

Moreau, Jean-François [178] see Bonneau, Adelphine

Morehart, Christopher (Arizona State University)**[285]** *The Archaeology of Ecological Imperialism in Central Mexico*

In the 1960s and 1970s, cultural anthropologist Roy Rappaport criticized the effects of the West on the developing world. Well before Crosby popularized the term, Rappaport labeled this process "Ecological Imperialism" to clarify the unequal relationship between the needs of an empire and environments it absorbs. Rappaport wrote when scientists were beginning to observe global ecological degradation, but anthropologists had yet to develop a historical perspective. Over the past decade, archaeologists have demonstrated ecological degradation also has a history: past states and empires dramatically altered their environments. Archaeologists also recognized that such environmental impacts constitute legacies that shaped the political economy for subsequent states and empires and the social and physical landscapes of everyday people. This paper reassesses the notion of Ecological Imperialism in this vein. I focus on the Aztec and Spanish empires of central Mexico (ca. fifteenth to nineteenth century CE). I argue that the political economies of the two imperial systems built different systems of environmental interaction. But they greatly influenced each other in negative and positive ways. A consideration of both are necessary to understand the long-term consequences that continue to be inherited into the present systems of global Ecological Imperialism.

[174] *Discussant*

Morehart, Christopher [8] see Pacheco-Fores, Sofia

Moreiras Reynaga, Diana (University of Western Ontario), Jean-Francois Millaire (University of Western Ontario) and Fred Longstaffe (University of Western Ontario)**[8]** *Where Did the Sacrificial Subjects Live? An Oxygen Isotope Study of Individuals Sacrificed by the Aztecs during the Late Postclassic Period*

We present preliminary interpretations of the residential patterns of Aztec sacrificial subjects from the Templo Mayor of Tenochtitlan and the Templo R of Tlatelolco (present-day Mexico City) who died during the Late Postclassic period (AD 1400–1519). The study uses oxygen isotope analysis of bioapatite phosphate to assess whether these individuals lived in the Valley of Mexico during the last years of their lives or were brought in from distant Aztec provinces. Tissues analyzed also include individuals from a local residential burial site in nearby Ecatepec, which provides a local phosphate oxygen isotope baseline. We find that, besides a few interesting cases, the majority of the sacrificial subjects (children and adults) resided in the Valley of Mexico prior to being offered to the Aztec gods.

Morell-Hart, Shanti (McMaster University)**[82]** *Flora, Ethnoecology, and Foodways in the Land of the Sky*

Analysis of botanical residues recovered from the Río Verde Valley has yielded a wealth of information about activities of ancient inhabitants. Data from this paper were derived from large-scale excavations at the Terminal Formative urban center of Río Viejo, and the Terminal Formative outlying sites of Cerro de la Virgen and Loma Don Genaro. Evidence of agricultural practices as well as the collection of wild and fallow-dwelling plants have been revealed through charred seeds and other macrobotanical remains. The recovered archaeobotanical specimens indicate the use of several typical economic species, as well as a range of uncommon plants that may have been used for various purposes including fiber, medicine, and ornament. Moreover, the distribution of species across each site informs understandings of spatiality in terms of distinctiveness or overlap of activities taking place at individual loci. The diversity of practices represented by the botanical remains adds nuance to traditional paradigms of Formative Period foodways and ethnoecology in the region.

[5] *Chair*

Morell-Hart, Shanti [22] see Bérubé, Éloi

Morello Repetto, Flavia (Instituto de la Patagonia, Universidad de Magallanes), Marta Alfonso-Durruty (Kansas State University, Department of Sociology), Marianne Christensen (Université de Paris I Panthéon-Sorbonne, UMR 7041), Luis Borrero (CONICET, Instituto Multidisciplinario de Historia) and Manuel J. San Roman (Universidad de Magallanes, Instituto de la Patagon)**[231]** *Cultural Interaction and Fuegian Islands Archaeology: Discussing Middle and Late Holocene (50°–55° South Latitude, Chile)*

The Fuegian archipelago, dominated by three mayor islands, namely Tierra del Fuego, Dawson, and Navarino, is located namely at southernmost end of South America and was peopled by hunter-gatherer societies from c. 10,500 BP to the twentieth century. Sea coastline areas have evidence of specialized marine adaptation since c. 7,000 BP, including navigation. Ethnohistoric and ethnographic records account for an overlapping network area of three groups: Selk'nam land hunters and Alacalufe or Kawésqar from central-western Patagonia and Yámana or Yaghan, south of the Beagle channel, the latter two groups being defined as specialized maritime nomads. The use of the subsistence dichotomy between terrestrial/marine and pedestrian/canoe has limited research hypothesis and the comprehension of the archaeological record. We present a broad comparison of cultural interaction data from the Middle and Late Holocene archaeological record is developed, focusing on lithic/bone technological traits (e.g., Levallois core reduction method) and raw material distribution (e.g., obsidian and Miraflores rocks).

Morello Repetto, Flavia [226] see Borrero, Luis

Moreno-Guzman, Maria Olvido [225] see Filloy, Laura

Morenon, Pierre
[371] *Chair*

Moretti, Alexia [233] see Litschi, Melissa

Morgan, Christopher (University of Nevada, Reno), Loukas Barton (University of Pittsburgh) and Robert Bettinger (University of California, Davis)

[99] *From Serial Specialist to Cereal Specialist: Managing Hunting and Husbandry in the Context of the Terminal Pleistocene-Early Holocene Fitness Landscape of North China*

Recent reconstructions of terminal Pleistocene-early Holocene settlement and subsistence patterns in northern China indicate that the intensive yet highly mobile hunting pattern that developed during the Younger Dryas as a way of mediating the increased temporal and spatial patchiness of the terminal Pleistocene resource base was maintained and even facilitated by early experiments with farming millet in the early Holocene. The long-term viability of this novel adaptation was evaluated in the context of other adaptations that first appeared in the region in the Early Holocene. Within this framework of competing adaptations, it is argued that though mobile hunter-farmers may have initiated the adoption of agriculture multiple times across northern China in the terminal Pleistocene, this lifeway was ultimately outcompeted by a less mobile, more agriculturally-dependent adaptation that could support greater population densities in the early and middle Holocene.

Morgan, Christopher [114] see Barton, Loukas

Morgan, Kathryn (University of Pennsylvania)

[323] *The Vestments of My Mysteries: Craft Production and the Ritual Economy at Iron Age Gordion*

The Terrace Building Complex at the Iron Age site of Gordion in Turkey has been called the most complete picture of organized textile production at a Mediterranean palatial center. Artifactual analysis of the numerous textile tools discovered in the Terrace Building has provided a foundation for ambitious models of the Phrygian political economy: it's been suggested that textiles produced in this "industrial quarter" were intended as payment for the Phrygian army, or tribute. Analyses of the individual "workshop" units of the Terrace Building, however, does not necessarily support the notion that the complex was built as a workshop exclusively for such politico-economic ends. Rather, the wide range and spatial arrangement of the myriad non-textile-related finds in this monumental building indicate that these were multipurpose units. The straightforward models derived for identifying craft specialization and characterizing its relationship to social and political organization are, in the case of Gordion, insufficient. I draw on the emerging theory of the ritual economy to explore connections between the production zone of the Terrace and the wider cultural and political landscape of Early Phrygian Gordion in order to derive a more culturally embedded model for the relationship among craft activity, social capital, and economic value.

Morgan-Smith, Maggie (University of North Carolina at Chapel Hill)

[280] *Ours and Theirs: Chapels and Community Dynamics at Rancho Kiuic, Yucatán, Mexico*

Drawing on recent excavation and oral history data from the site of Rancho Kiuic, this paper will compare information related to two chapels located within the community. Formerly known as San Sebastián, the community functioned from the late Colonial to National periods as a ranching operation occupied by several generations of Maya-speaking landowners and laborers. Though the two chapels (Capillas I and II) share a number of structural and temporal characteristics, their respective locations, assemblages, and oral histories suggest that they served different sectors of Rancho society. I argue that differences in the uses and material signatures of these two chapel complexes lend insight into community dynamics, specifically related to socioeconomic distinctions among the Rancho's population.

Moriarty, Ellen, Ronald L. Bishop (Smithsonian Institution), Matthew Moriarty (Castleton University) and Antonia Foias (Williams College)

[125] *Ceramics and Society within the Late Classic Motul de San José Polity: A Multidisciplinary Perspective*

Over the past 15 years, Late Classic ceramics from Motul de San José and surrounding sites in the Central Petén Lakes area have been subjected to a variety of technical analyses. Modal and petrographic analyses of ceramics from sites throughout the Motul area have been used to explore intra-polity patterns of production and exchange for both elite and mundane vessels. At the same time, Instrumental Neutron Activation Analysis (INAA) has been conducted on sherds from Motul to define production and exchange patterns for the well-known Ik' corpus of feasting vessels, and has elucidated elite social networks between centers across the southern Maya lowlands. In this paper, we combine the various lines of technical research and present new INAA data from a constellation of nine sites—from modest farming hamlets to a major trading port—within the Motul polity. Using this extremely robust dataset, we reexamine ceramic production and exchange between Motul and its satellite centers. We also consider how the larger Motul polity, through the perspective offered by the various smaller sites, was incorporated into larger, interregional interaction spheres.

Moriarty, Matthew (Castleton University)

[260] *The Galick Site: Initial Investigations at a Precontact Site on the Vermont Shore of Lake Champlain*

The Galick site, located at the southern terminus of Lake Champlain, has long been identified as a potentially critical context for examining the precontact occupation and ecology of the southern Lake Champlain basin. Both its position at the confluence of local and interregional transportation networks and its setting within an area of remarkable biological diversity highlight the Galick site's potential importance to foragers and early farmers operating along the southern shores of Lake Champlain. In 2016, the South Champlain Historical Ecology Project conducted the first intensive archaeological investigations at the Galick site and began delineating what appears to be a major multicomponent campsite. This poster presents the initial results of 2016 research and provides an early outlook on the Galick site's potential significance within the larger Lake Champlain basin.

Moriarty, Matthew [125] see Moriarty, Ellen

Morin, Eugène (Trent University)**[85]** *The Number of Distinct Elements (NDE): An Alternative Measure of Faunal Abundance*

NISP (Number of Identified SPecimens) and MNE (Minimum Number of Elements) are frequently used as measures of anatomical abundances in archaeology. Recent experimental results suggest that NISP provides estimates of skeletal abundances that are less robust than those based on MNE. However, our analysis of paired NISP-MNE data shows that MNE is prone to inflate the representation of rare parts. Moreover, MNE is known for being severely impacted by aggregation methods. These fundamental problems considerably limit the value of MNE as a measure of abundance. This paper introduces an alternative counting method called the Number of Distinct Elements (NDE). This new metric focuses on the occurrence of predetermined, invariant landmarks tallied on mutually exclusive specimens. Preliminary experimental results suggest that NDE counts are robust predictors of faunal abundances. Moreover, the NDE approach eliminates the long and tedious task of spreading and drawing specimens to identify fragment overlap. Furthermore, NDE values are additive and easily calculated. For these reasons, the NDE approach constitutes a compelling alternative to MNE in the analysis of faunal patterns.

[85] *Chair*

Morin, Jesse (University of British Columbia), Tood Kristensen (Historic Resources Management Branch, Old St. Step), John Duke (SLOWPOKE Nuclear Reactor Facility, University of A), Andrew Locock (Department of Earth and Atmospheric Sciences, Univ) and Courtney Lakevold (Historic Resources Management Branch, Old St. Step)

[91] *The Exchange of Ground Nephrite Celts across the Rocky Mountains*

Nonlocal nephrite (jade) artifacts are reported from archaeological sites in northern and central Alberta and are derived from nephrite tool producing areas in southwest British Columbia. This is evidence of trade extending more than 800 km distant across the Rocky Mountain divide. We provide results from a variety of nondestructive techniques (portable X-ray fluorescence, X-ray diffraction, and near-infrared spectrometry) to determine the geochemistry and mineralogy of nephrite ground stone celts found in Alberta, and to associate those individual artifacts with documented celt-producing areas in British Columbia. The accurate identification of nephrite can reveal significant cultural relationships that involved long distance exchange of raw materials between occupants of Alberta and British Columbia. The rarity of nephrite celts in Alberta and comparison of their morphology with those from British Columbia suggests that nephrite celts were primarily prestige-related tools in Alberta.

Morin, Jesse [46] see Muir, Robert

Morison, Melissa (Grand Valley State University)**[132]** *Taking Out the Trash: Resilience and Reuse in a Late Roman Urban Space*

This paper presents analyses of Late Roman pottery from the Gymnasium complex at ancient Corinth, Greece. Ceramic vessels from well-stratified deposits in multiple functional areas of the complex, dating from the late fourth through late sixth centuries CE, provide evidence for patterns of community resilience and adaptive capacity over a period of significant socioeconomic change. Analyses of the Gymnasium ceramic assemblage reveal significant shifts in Corinth's engagement with pan-Mediterranean trade networks, a repurposing of a significant civic complex, and related shifts in attitudes toward trash disposal, ritual, and pollution (both physical and otherwise). These changes in the conception and use of space within and adjacent to the Gymnasium complex, occurring over two centuries—from the “collapse” of the Roman Empire through the subsequent transition to the new structures of the early Medieval (“Late Roman”) period—help to expand understanding of the role of large, diverse, multicultural urban centers such as Corinth in mediating regional response to larger-scale processes of cultural transformation.

Moritz, Ryan (California State University Los Angeles) and René L. Vellanoweth (California State University Los Angeles)**[300]** *A Correlation Analysis of Expedient Stone Tools and Faunal Remains at the Tule Creek (CA-SNI-25), San Nicolas, California*

People have utilized stone tools for food procurement, manufacture of utilitarian and nonutilitarian goods, and self-defense for thousands of years. On the California Channel Islands, both formal (curated) and informal (expedient) stone tools have been observed in the archaeological record. Tule Creek (CA-SNI-25) is a large multicomponent site located on an uplifted marine terrace on the north coast of San Nicolas Island, outermost of the California Channel Islands. Humboldt State University and California State University Los Angeles (CSULA) conducted open-area excavations to investigate the cultural significance of the site and to find intact features. Formal and expedient stone tools were recovered from these excavations along with numerous features, bone and shell tools and ornaments, and extensive faunal remains. In this paper, we present the results of a correlation analysis of the expedient stone tools and the faunal remains found at the Tule Creek site. Our results suggest that there are no statistical correlations between the distribution of expedient stone tools and faunal remains at Tule Creek. This analysis allows for the further understanding of the roles that expedient stone tools performed on an island environment.

Moro Abadia, Oscar [175] see Chase, Amy

Morris, Joan [77] see Mathews, Darcy

Morrison, Alex (International Archaeological Research Institute) and Melinda Allen (University of Auckland, Department of Anthropology)**[180]** *Examining the Causes of Migration into East Polynesia: A Bayesian Chronology Perspective on the Ideal-Free Distribution Model*

The colonization of the islands of East Polynesia was one of the most rapid and expansive migratory events in human history. While extensive research focuses on determining the chronology of East Polynesia colonization, far less attention has been placed on elucidating the processes that influenced this migration. The Ideal Free Distribution Model of human behavioral ecology has proven useful for exploring a range of issues regarding colonization and mobility in varying ecological contexts around the globe. In this presentation we use the Ideal Free Distribution Model to generate prediction about the factors that influenced movement out of West Polynesia into East Polynesia. As context for the study, we begin by reevaluating the suite of initial radiocarbon dates for East Polynesia using a Bayesian calibration framework. We then revisit West Polynesian archaeological assemblages dating to the time period directly preceding the colonization of East Polynesia and review the archaeological evidence for inland settlement, increased competition, and emerging status differentiation. These results are integrated into a Bayesian chronological model and compared statistically with our estimate for East Polynesian colonization. Finally, we address a set of hypotheses based on the Ideal Free Distribution Model in light of our results.

Morrison, Blythe [122] see Riggs, Charles

Morrison, Kathleen (University of Chicago)**[325]** *LandCover6K: Using Archaeology to Improve Climate Models*

This paper introduces LandCover6k, an international collaboration dedicated to reconstructing Holocene land cover (vegetation) and land use on a global scale. Throughout the Holocene, human land use has led to changes in vegetation as well as having other effects on global climate. These effects are typically modeled (anthropogenic land cover change models, ALCC) using limited historical information, with the results of such models used in climate models. Existing ALCC models differ significantly, however. LandCover6k aims to contribute to climate modeling efforts by aggregating archaeological, historical, and pollen data on a global scale.

[285] *Discussant***[325]** *Chair***Morrow, Sara (University of Notre Dame) and Meredith S. Chesson (University of Notre Dame)****[207]** *Networks of Material Mediation: Shopkeepers in Rural Community Social Dynamics*

While archaeologists have explored networks of trade and exchange of manufactured goods between rural communities, regional market towns, and urban centers, less attention has been given to the way that rural shops and shopkeepers played a significant role in the accessibility and distribution of material goods in local economies. Focused on the emergence of rural shops in Western coastal Ireland and islands of Inishark and Inishbofin, 1840–1950, this study will contribute to an understanding of how rural communities created and maintained local shops through tumultuous and stable periods of economic transition. Rural communities, in particular islanders, without the institutional support of the national government or mainland banks, forged unique pathways to acquire shop capital, import vital goods and supplies to communities, and make payments to urban wholesalers. Recent excavations by the Cultural Landscapes of the Irish Coast Project on Inishark and Inishbofin, combined with records of wholesale distribution networks in historic shop ledgers and oral history, will further an understanding of how rural, and at times isolated, communities mitigate their material status through unique forms of entrepreneurship and community cooperation.

Morse, Charles (University of Notre Dame) and Meredith S. Chesson (University of Notre Dame)**[191]** *Bodies, Bowls, and Burial: New Perspectives on the Bab adh-Dhra' Mortuary Assemblage*

Though death may seem an instantaneous experience, the treatment of death by a mortuary community provides implications for activity and identity that stretch far beyond a stilled heart. Archaeologically, we can use evidence associated with mortuary practices to inform us about lifeways and beliefs of the interred and the community at large. Mortuary contexts from the Early Bronze I (3500–3100 BCE) at Bab adh-Dhra' provide just such an opportunity. The site, situated in the Southern Ghor region of Jordan near the Lisan Peninsula of the Dead Sea, presents a diverse burial assemblage associated with shaft tomb burials. By conducting a comparative analysis of the mortuary materials that focuses on the appearance and treatment of atypical goods—including basalt bowls, maceheads, figurines, and wood objects—compared to more ubiquitous materials—osteological remains, ceramics, and beads—we can gain insight into their notions of value. By investigating their concepts of value in this assemblage, we provide a better understanding of complex practices for a group that show a marked investment in a cemetery location before their later shift to settlement at the site.

Morton, Shawn (University of Calgary)**[337]** *The Symbolic Centre: The Preclassic Legacy of Yaxnohcah's E-Group*

For nearly 2,000 years, the E-Group at Yaxnohcah served as this city's spiritual and administrative heart. From the early facet of the middle Preclassic through the Terminal Classic, as the rest of the site grew, morphed, and ultimately fell into disuse, this group continued to be remodeled, refurbished, and rededicated. Further, in a stunning testimony to social memory, and after a period of clear abandonment, it became the focus of Postclassic activity that included the erection of a diminutive stela. In this paper I explore the broader significance of this group within the context of the Preclassic Central Karstic Uplands and contemplate Yaxnohcah's lengthy presence in this region from the perspective of this early base.

Moses, Sharon (Northern Arizona University)**[107]** *The Multivocality of Firearm Materials among the Captive Africans of the Hume Plantation, Georgetown, South Carolina 1790s–1860s*

This paper will discuss firearm materials and related artifacts found in the slave quarter of the historic Hume Plantation, a rice producer in the South Carolina low country from the late eighteenth century until the Civil War. Due to the historical context of violent outbreaks in the region including a murder at a neighboring plantation, it would seem that firearms and materials that could be used for weaponry would be highly prohibited among the enslaved population. Furthermore, according to laws at the time, enslaved Africans found in possession of such materials could face severe punishments and even death. This paper is an exploration of the implications of European masters who may have allowed them in certain cases, and the multivocality of meaning these materials represented to those enslaved who possessed them.

Moses, Victoria (University of Arizona)**[127]** *The Many Roles of Roman Dogs*

The Romans had a strong interest in the natural world. Their relationships with animals extended from animals as food source to animals as exotic curiosities and everything in between. Dogs held a complicated position for the Romans, filling a wide range of roles. For example, dogs could be companions, war weapons, street cleaners, or victims of sacrifice. This variety shows how dogs were conceptualized sometimes as individuals and pets, sometimes as pests, and other times as powerful and almost magical beasts. This paper explores many of the roles of dogs in the Roman world using zooarchaeological and textual evidence. The main focus is the use of puppies and dogs in medicinal and religious rituals.

Moss, Madonna (University of Oregon)**[77]** *Did Tlingit and Haida Eat Sea Otters during the Precontact Period? An Issue of Intellectual Property and Cultural Heritage*

In recent years, zooarchaeological studies have been designed to address a variety of issues in conservation biology, but rarely has zooarchaeology been used to document cultural practices that are currently under public scrutiny. Use of sea otters is part of Tlingit and Haida cultural heritage. Conducted with Sealaska Heritage Institute, this project attempts to show how laboratory analysis of archaeological collections can document butchery and processing practices that have direct implications for issues of contemporary wildlife and ecosystem management and sustainable harvesting by Alaska Natives. Sealaska Heritage Institute is sponsoring this study because it seeks to increase scientific knowledge and make it available to local resource users. Sealaska also aims to educate the larger public about the long-term relationships Tlingit people have maintained with sea otters and other wildlife.

[380] *Discussant*

Most, Corinna [284] see Schoeninger, Margaret

Mötsch, Angela [173] see Rageot, Maxime

Motta, Laura (University of Michigan) and Scott Russel (Oberlin College)

[142] *Eating Like a Bird: Millet in Iron Age Italy—Economic, Political or Identity Choice?*

Recent research reevaluating the evidence for consumption of millet in Archaic and Roman Italy indicates that its role has been underestimated. New findings from Iron Age and Archaic contexts at the Latin settlement of Gabii clearly support a more nuanced and complex situation than the one portrayed by ancient Latin authors and modern scholarship alike. The recovery of significant quantities of millet at Gabii is in sharp contrast with the absence of this crop in similar contexts from Iron Age Rome. These patterns suggest interesting implications for the understanding of the cultural and political landscape of central Italy during the Iron Age. Issues of identity, economic practice and sociopolitical interactions in a period of rapid transformations toward urbanism are here presented.

Moutsiou, Theodora (University of Cyprus)

[88] *Using pXRF to Unravel Raw Material Choices in Early Holocene Lithic Assemblages from the Island of Cyprus, Eastern Mediterranean*

This poster presents the preliminary results of an extensive geo-chemical fingerprinting program using pXRF that was undertaken on a large and diverse lithic collection that included three different raw materials, namely obsidian, carnelian and picrolite. Specifically, the project investigated the use of these three raw materials in Early Holocene lithic assemblages—stone tools and ornaments—from the island of Cyprus, eastern Mediterranean. Obsidian, carnelian and picrolite have been defined as the three rare rock types that found their way to Cypriot assemblages that date between 12,000 and 5500 cal BP. Interestingly, two of them reached the island via a sea-crossing whereas picrolite albeit insular is a rare resource. Contrary to previous work that examined only a small proportion of obsidian or picrolite (but not carnelian) collections from the island's early sites, this project used HH pXRF to analyse all the artifacts made on these materials with the aim to establish a) numbers of utilised sources and, b) patterns of source preferences. The overall aim is to address the extent and directions of human interactions in the eastern Mediterranean and the reasons behind the choice of the above raw materials over the locally available options.

Mower, Courtney (Arcadia University), Anna Dhody (Mütter Museum), Kimberlee S. Moran (Arcadia University) and Shanan S. Tobe (Arcadia University)

[14] *Authentication of Museum-Curated Tsantsas Utilizing Next Generation Sequencing Technology*

The Shuar, native to Northern Peru and Southern Ecuador, prepared shrunken heads to serve as trophies following battle, in response to their cultural beliefs. Authentic shrunken heads (tsantsas) were prepared in a precise manner and exhibit key morphological characteristics. Forgeries, including primates and inauthentic human preparations, were marketed to tourists and private collectors to profit from the "savage" image surrounding the Shuar. Inauthentic shrunken heads were prepared in a nontraditional manner; however, key morphological characteristics may be present highlighting the need for DNA analysis to provide further discrimination. Species identification was conducted to identify a head as human, sloth, or primate. Genetic markers were analyzed using next generation sequencing to determine the provenience of the shrunken heads, as a means of authentication, since forgeries are often European, while tsantsas are of South American ancestry. Maternally and paternally inherited DNA was also analyzed to determine the potential relatedness among authentic tsantsas, due to the taking of women following battle. This method of analysis can be applied more broadly in forensic science to cases involving the identification of human remains and the illegal sale of antiquities on the black market, threatening cultural preservation.

Mower, Courtney [14] see Tobe, Shanan S.

Moy, Rachel (UCLA)

[309] *Mai Adrasha and Its Neighbors*

A team from UCLA in cooperation with the Tigrai Culture and Tourism Agency and the Authority for Research and Conservation of Cultural Heritage of Ethiopia has completed two excavation seasons at the site of Mai Adrasha located about 70 km west of the ancient capital of Aksum. With the information gathered in these excavations, we can now begin to compare Mai Adrasha to neighboring sites and place it within its regional framework. Radiocarbon dates from the first season of excavation yielded dates from the twelfth century BCE to the second century CE, making Mai Adrasha contemporary with nearby Seglamen, Biata Giyorgis, and ancient Aksum. Besides relating Mai Adrasha to neighboring Pre-Aksumite and Aksumite sites, being the westernmost Aksumite settlement to be systematically investigated, Mai Adrasha can also be compared to sites further west, potentially as far as Sudan. This paper will outline the results of the first two seasons of excavation and relate Mai Adrasha more broadly to neighboring sites and polities.

[309] *Chair*

Moy, Rachel [309] see Jones, Terrah

Moyes, Holley (University of California, Merced)

[29] *Mapping Caves: Telling the Story*

Maps are symbols. While we often think of them as representations of the real world, they are in fact interpretations of the space no matter how accurately and precisely produced. Maps tell a story—YOUR story. Maps make an argument. No two people will map a space in exactly the same way and no two stories will be completely alike. While some researchers are primarily concerned about precision and accuracy in representation, others focus on more humanistic, sensory, or phenomenological elements. Caves are particularly difficult to represent because of their topographic complexity and differ significantly from built environments because their natural organization is not based on a social logic. These problems exist not only with caves but also with all complex spaces in both how to map and what to map. The 3-dimensionality of the space and how one experiences it exacerbates representational challenges, particularly when using Geographic Information Systems or other 2D or 2.5D programs. In this paper I discuss methods in cave mapping using examples from ancient Maya cave sites in Belize. I suggest that rather than thinking of archaeological maps as a form of scientific data creation, we envision them as telling a story of the cave.

Moyes, Holley [68] see Ray, Erin

Mrozowski, Stephen (Fiske Center for Archaeological Research, University of Massachusetts Boston)

[141] *The Pragmatic and Epistemological Challenges of Collaborative Research*

This paper outlines some of the lessons learned from more than a decade of working with the Hassanamisco Nipmuc of Massachusetts. During the course of this evolving collaboration there have been many epistemological and ontological challenges. Chief among these has been finding common ground between the questions pursued archaeologically and those that hold relevancy for indigenous peoples. Rather than seeing these as contrasting purposes the Hassanamesit Woods Project has found productive ways of joining these into a common purpose. What has emerged is an archaeology that in many respects is traditional in focus that combines sound empirical research with a pragmatic philosophy that sees value in practical outcomes. The result has been a highly productive, socially satisfying collaboration that has been embraced by Nipmuc elders and youth alike. It has also resulted in a series of joint publications as well as book length manuscript that is in progress.

Mozarowski, Steve [49] see Duelks, Jonathan

Mueller, Natalie

[174] *The Role of Ritual in Early Food Producing Economies: Seed Keepers and Seed Exchange in Ethnography and in the Archaeological Record of Eastern North America*

The ethnographic record is replete with examples of farming societies for whom the maintenance and exchange of seed stock was imbued with ritual significance. Seed keeping is often an institutionalized role for families or individuals: a matter of pride, as aspect of identity, and a heavy responsibility. The establishment of these rituals and institutions may have been crucial to the domestication of annual plants and the development of food producing economies. What would seed keeping and seed exchange rituals look like in the archaeological record? The presence of 'precocious domesticates' in clearly ritual contexts is one possible archaeological correlate. I present evidence of anomalously early domesticated erect knotweed (*Polygonum erectum* L.) from a Middle Woodland mound in Kentucky (Walker-Noe 15GD56) and suggest directions for further research.

Mueller, Raymond, Jessica Hedgepeth Balkin (University of Colorado, Boulder) and Arthur Joyce (University of Colorado, Boulder)

[82] *Agricultural Productivity of Four Different Physiographic Zones in the Lower Río Verde Valley, Oaxaca, Mexico: Using the Current Landscape as a Means to Facilitate an Understanding of Past Productivity*

As part of the larger Río Verde Settlement Project (RVSP), soil sampling of different physiographic zones was conducted during the spring of 2016 in the lower Río Verde Valley. The major goal of this sampling program was to assess variation in soil fertility across the region, as related specifically to maize agriculture. The lower Verde Valley was broadly divided into four physiographic zones (floodplain, coastal plain, piedmont, and secondary valleys). Previous studies identified the floodplain as the most agriculturally productive zone, but only broad-based environmental data were previously available. Our study sought to capture large-scale soil variation between physiographic zones as well as smaller-scale variation within each zone. Samples were therefore taken in different microenvironments within each physiographic zone. Efforts focused on surface soil samples, but paleosols were also sampled whenever possible to calibrate for changes in landscape fertility between the prehispanic past and the present. Samples were tested for several major chemical indices representing requirements for maize agriculture (e.g., phosphorous and nitrogen levels as well as CEC). These data will be used to develop a GIS model of agricultural productivity in the lower Verde Valley and to help explain diachronic changes in settlement patterns.

Mueller, Raymond [82] see Hedgepeth Balkin, Jessica

Muir, Robert, Jesse Morin (K'omoks First Nation [staff archaeologist]), Hilary Pennock (Simon Fraser University), Sarah Dougan (Simon Fraser University) and Wedlidi Speck (K'omoks First Nation [cultural advisor])

[46] *The Pentlatch Pebbles: Incised Stones from an Ancient K'omoks Village Site in Courtenay, British Columbia*

Recent excavations at the K'omoks First Nation ancient village site at Pentlatch resulted in the discovery of 122 incised pebbles and small cobbles. Such artifacts are very rare in the Pacific Northwest, with only one other comparably large assemblage having been reported at Tse-whit-zen in Port Angeles, Washington. The incised stones from the Pentlatch site were found throughout the site area and from all stratigraphic contexts, spanning (at least) several hundreds of years of occupation; nonetheless the artifacts display remarkable consistency in design elements and motifs. The most common motif, described by us as "parted hair and braids," bears striking resemblance to ethnographic imagery of young women participating in a traditional puberty ritual. This interpretation of the motif is explored and evaluated by drawing on traditional knowledge of K'omoks Nation community members and ethnographic literature from the Salish Sea region.

Mullen, Alice (University of The Witwatersrand)

[28] *Significantly Differentiated Figures: Understanding Difference through the Construction of Personhood in the Southern African San Idiom*

Within the corpus of San rock art in the South African Drakensberg Mountains is a category of highly embellished, oversized anthropomorphic figures termed Significantly Differentiated Figures (SDFs). Such images have previously been interpreted as San ritual specialists' conceptualization of themselves, in metaphor, as a result of the arrivals of African farmers and European colonists. This paper, drawing on new data gathered during surveys of the Matatiele region in the Eastern Cape, South Africa and the Sehlabathebe National Park in Lesotho, shifts focus from broad discussions on the embodied experiences of ritual specialists to the significance of individual SDF images within the region. A newly identified site is to be sampled for dating, with a view to challenging interpretations of SDFs as a recent phenomenon in the history of San rock art production. Examination of ethnographic texts relating to San personhood highlights the construction of identity through a network of relationships between human and nonhuman beings existing both in the mundane and spiritual universes of San peoples, offering insight into why certain nonhuman features may have been incorporated into these highly distinctive figures and what message they may have conveyed to subsequent viewers.

Mullen, Kyle (University of Kentucky)

[320] *Dune Settlement in the Wake of Tres Zapotes*

As the Tres Zapotes polity's economic and political power diminished in the Early Classic, the eastern lower Papaloapan Basin (ELPB) became a political frontier as sites in this contested region strengthened ties to both Classic Veracruz and Central Mexico. It is during this time that a series of near-coastal paleodunes and estuarine lakes see an increase in occupational intensity. The ecological diversity of the dune landscape provides a unique setting to explore how the intersection of environmental, political, and economic factors impacted settlement patterns in the region through time. Over the course of field seasons in 2014 and 2015, 17 km² of systematic pedestrian survey was conducted on the dune landscape. Through the analysis of architecture and surface artifacts, this paper sheds light on the processes that brought people to the dunes during the Classic Period, in the wake of Tres Zapotes' decline.

Müller, Peter (Leibniz-Center for Tropical Marine Research [ZMT], Bremen, Germany), Philip Staudigel (University of Miami, Rosenstiel School of Marine and Sean Murray (University of Miami, Rosenstiel School of Marine), Hildegard Westphal (Leibniz-Center for Tropical Marine Research) and Peter Swart (University of Miami, Rosenstiel School of Marine)

[223] *Impact of Prehistoric Cooking on Proxy Signatures in Shell Midden Constituents*

The analysis of geochemical proxies in skeletal remains has become a standard tool in shell midden research. Sub-seasonally resolved proxy records provide information about environmental and anthropological aspects such as ancient climate conditions, fishing and foraging seasonality or site occupation pattern. However, as subsistence was the primary purpose for fishing activities in most prehistoric cultures, it is likely that many shell midden constituents were subjected to processing methods such as cooking prior to deposition, potentially altering their geochemical proxy records. To study the impact of prehistoric cooking methods on such proxy records, we exposed modern bivalve shells (*Mercenaria campechiensis*) to different prehistoric cooking treatments. Afterward, we analyzed shell mineralogy, conventional oxygen and carbon isotopes, various element/Ca ratios and their clumped isotopic composition. Our data clearly show that all prehistoric cooking methods cause an alteration of most paleoenvironmental proxies and in particular the oxygen and clumped isotopic signatures even without a conversion of the initial aragonite into secondary calcite. Thus, depending on the cooking method, predepositional heating might have introduced considerable errors into previous paleoclimate studies using shell midden constituents. Furthermore our data show that clumped isotopes can be used to clearly detect and differentiate between different cooking methods.

Mullins, Patrick [230] see Carpio, Margaret

Mummert, Jeff [189] see Wallsmith, Debbie

Munger, Tressa (Augustana University), Lindsey Romig (Augustana University), Amelia Cisar (Augustana University), Noah Fisher (Augustana University) and Kristen Carlson (Augustana University)

[345] *Experimental Analysis of Late Paleoindian Bone Tools at Bull Creek in Oklahoma*

Summer of 2016 excavations at the Late Paleoindian campsite, Bull Creek, in the panhandle of Oklahoma resulted in unique bone tool discoveries. Within a bone pile butchering feature, containing ribs and a vertebral column, a mandible tool was found in situ wedged into the head of a rib. The mandibular notch appears to have been used to pry the rib heads from the spinal column with the coronoid process and condylar process imbedded around the rib head. In addition to the mandible a scapula tool of unknown purpose was also discovered. Through the means of experimental archaeology, we used cattle bones to re-create the bison tools and experimented with their potential functions.

Munoz, Ivan [143] see Watson, James

Muñoz-Rodríguez, Mariana (University of York), Steve Ashby (University of York) and Lena Holmquist (Stockholm University)

[96] *Artifact Geographies of the Viking Age*

The hair comb is one of the most commonly recovered bone artifacts from early medieval sites in Northern Europe, particularly in Viking-Age Scandinavia. Beyond the bone hair comb's association with technological innovation, it acts as a powerful proxy for urbanism, human migration, and long-range trade in Viking-Age towns. Yet despite this prevalence, the bone hair comb remains understudied in recent years and few multi-site syntheses have been undertaken. Existing studies have focused on the stylistic and technological aspects of combs rather than the raw materials used in their manufacture. This is largely due to unreliable methods of raw-material identification for highly worked bone objects. Zooarchaeology by Mass Spectrometry (ZooMS) is a low-cost and minimally destructive proteomic technique which has been successfully applied in the identification of such raw materials. By producing a "peptide fingerprint," ZooMS can distinguish between the antler of biogeographically discreet deer species from which comb crafting components are sourced. Through the application of ZooMS to the analysis of bone hair combs, our study further characterizes the technological innovations and population dynamics of the Viking Age. This paper introduces a new project that will undertake such analyses across Viking and medieval Northern Europe.

Munro, Kimberly (Louisiana State University)

[272] *Persistence and Material Mnemonics in the Cosma Basin: 5,000 Years of Ritual Enactment in the Upper Nepeña River, Peru*

The Cosma Complex is located in the Cordillera Negra at the headwaters of the upper Nepeña River Valley, Ancash Peru. Fieldwork conducted between 2014–2016 documented repeated reconstruction episodes associated with the reuse of monumental ritual architecture originally dated to the Late Preceramic (3000–1800 BCE). By the Early Horizon infant remains and other offerings were placed into earlier architectural contexts as a final capping episode on at least one mound. As settlement patterns shifted, a third mound was constructed along an adjacent ridge-line. Based on the abundance of late pottery styles on the ridges, it appears that the Cosma basin was occupied well into the Late Intermediate Period and into Colonial times. This paper theorizes that Cosma persisted as a small but stable population through the construction, maintenance, and altering reuse of the monumental constructions, which were part of a venerated landscape of regional importance. By exploring questions of persistence, periods of hiatus, and reoccupation, as well as constructs of social memory and perception, I look at how successive generations may have perceived and been influenced by features of the local landscape, in particular the dominating local presence of the ritual mounds.

[272] *Chair*

Munro, Natalie (University of Connecticut), Jacqueline Meier (University of Connecticut) and Lidar Sapir-Hen (Tel Aviv University)

[340] *Early Human Control over Ungulate Taxa in the Southern Levant*

An expanding catalog of faunal assemblages spanning the Late Epipaleolithic through Pre-Pottery Neolithic (PPN) periods in the southern Levant points to growing human control over taxa that eventually become domesticated (wild goat, wild pig and wild cattle). This change in human-animal relationships occurs several centuries if not millennia before evidence for full-fledged management and domestication are visible in the archaeo-zoological record. We explore this shift by referencing data from 10 faunal assemblages spanning the agricultural transition and by the Early PPNB (10,500–10,200 cal. BP) that document the beginning of a trade-off between intensive human hunting evidenced by a broad array of animal taxa and resource depression, and ungulate taxa that are ultimately domesticated. We focus on local conditions that led to a reconfiguration of human-wild animal relationships and the nature of this interaction. Finally, we situate the southern Levant into its larger setting in Southwest Asia by emphasizing an increasingly protracted and multiregional picture of animal domestication and the importance of local ecology and regional social networks in facilitating the exchange of knowledge and possibly animals. Early evidence for new human-animal relationships prior to full-fledged animal management encourages reevaluation of what should be considered wild within the wild-domestic continuum.

Munro, Natalie [95] see Grosman, Leore

Munson, Jessica (Lycoming College) and Lorena Paiz Aragón**[125]** *Ceramic Variation and Ritual Behavior at Altar de Sacrificios, Petén, Guatemala*

Located at the headwaters of the Usumacinta and the confluence of the Salinas and Pasión Rivers, Altar de Sacrificios is uniquely positioned with strategic access to points far beyond its sandy shores. Despite the geopolitical importance of this site, Altar has not featured prominently in recent narratives about the political history of Classic Maya society. After more than 50 years, a new phase of archaeological investigations seeks to bring Altar out of the shadows and reevaluate this city's role and contributions as a place for exchange, innovation, and social interaction within the Maya lowlands. In this paper, we analyze the contents of ritual deposits excavated by Harvard University (1958–1963) and the current Altar de Sacrificios Archaeological Project (ALSAP) to gain a better understanding of the diverse ritual practices performed within this community. In particular, we focus on the variation of ceramic vessels recovered from cache deposits and burials to map out Altar's sphere of influence and interaction during the Late Preclassic to Classic period transition.

Murakami, Tatsuya (Tulane University), Shigeru Kabata (Universidad de las Américas Puebla) and Julieta López (Universidad Nacional Autónoma de México)

[353] *Architecture and Urban Transformation in Formative Central Mexico: New Findings from the Tlalancaleca Archaeological Project, Puebla*
Tlalancaleca was one of the largest settlements before the rise of Teotihuacán in Central Mexico and likely provided cultural and historical settings for the creation of Central Mexican urban traditions during later periods. Yet its urbanization process and architectural traditions remain poorly understood. Our research over the last five field seasons indicates that Tlalancaleca was urbanized during the Middle Formative period (ca. 650–500 BC) and experienced large-scale urban transformations during the Late Formative (ca. 500–100 BC) and a subsequent and final urban expansion during the Terminal Formative (ca. 100 BC–AD 200/250). This paper presents preliminary results of excavations, which were carried out at monumental structures at Tlalancaleca. It discusses the construction techniques used for talud-tablero facades (a combination of sloping walls and vertical panels) and the temporal relationship between the introduction of the talud-tablero style and the urban development. Preliminary analysis suggests that the talud-tablero was introduced sometime during the Terminal Formative period and was associated with urban expansion before the abandonment of the site.

[353] *Chair*

Murakami, Tatsuya [293] see Fukuhara, Hironori

Murguía Hernández, Ana Iris (Universidad Juárez del Estado de Durango)**[352]** *La Feria Colonial: Flow and Exchange of Products in the Nueva Vizcaya in the Eighteenth and Nineteenth Centuries*

The trade network in the colonial era formed a great circuit that used communication paths. El Camino Real de Tierra Adentro was used to transport the products sold through fairs that were established at strategic points in the New Spain. Kingdoms away as was the Nueva Vizcaya had people who used to travel these roads annually to bring their products and other materials to get points not only of the New Spain, but also from Spain and the Philippines. The circuit of fairs and marked trails around these strategic points show how the flow and exchange of goods between the various kingdoms of New Spain and the Metropoli worked.

[352] *Chair*

Muro, Luis [233] see Perea, Ema

Murphy, Beau (University of New Mexico) and Cristián González Rodríguez (Universidad de Chile)**[346]** *A GIS Analysis of Production Areas, Ritual Spaces, and Socioeconomics at the Mixed Inka-Local Administrative Center of Turi, Northern Chile*

While anthropologists are often concerned with profiling the socioeconomic character of the cultures they study, this task can be challenging for archaeological researchers investigating long-abandoned settlements. Intrasite socioeconomic reconstructions in particular may depend upon such factors as the accurate detection of specific production activities and the partitioning of architectural features into socially informative categories. This paper presents a case study on this topic wherein GIS is used to quantitatively define production loci and evaluate the spatial organization of architectural groups. The distribution of production materials across the site surface of Turi, an Inka administrative center in Northern Chile, are first evaluated to define specific production loci. These data are paired with a typological assessment of Turi's ritual structures, known as chullpas, to elucidate differences in social identities across the settlement. Integrating these datasets with several additional GIS-based analyses supports the authors' advancement of preliminary hypotheses regarding the settlement's socioeconomic organization. Results indicate a complex imperial-local political economy operating upon a community of "neighborhoods," whose chullpas evidence distinct social associations. These results are contextualized within Inka studies and the general application of GIS to resolve site-level socioeconomic data, and the efficacy of the utilized analytical units and methods are further discussed.

[346] *Chair*

Murphy, Beau [75] see Casanova Vasquez, Erick

Murphy, Charlene (University College London, Institute of Archaeology)**[53]** *Using Computerized X-ray Tomography to Track Rates of Agricultural Domestication Using Seed Coat Thickness*

Pulses were an important crop in human prehistory. Tracking traits of domestication in pulses has been limited in the past due to poor preservation of diagnostic features of domestication. Traditionally, morphometric techniques have focused on changes in seed size. The authors measured horsegram (*Macrotyloma uniflorum*) from South Asia, dating from the Neolithic (2000 BC) to the Early Historic Period (AD 400–700), which showed an increase through time with domestication. This is in juxtaposition to other pulses such as lentils from the Near East that show a slower and gradual increase in size without a clear leveling off after the Neolithic. To understand these differences in pulse domestication trajectories another trait of domestication was studied. Decreases in seed coat thickness have been an assumed trait of pulse domestication. We measured seedcoat thickness in horsegram from southern India dating from 4000 and 3200 years BP with computerized X-ray tomography using the UK Synchrotron. It was the first time archaeological pulses have been successfully imaged. We discovered different grades of testa thickness over time, which suggests this trait is not under the control of a single underlying genetic factor. Thus, synchrotron technology offers new possibilities into nondestructive, high resolution imaging to investigate specific archaeological issues.

Murphy, Joanne (University of North Carolina Greensboro)**[136]** *Ritual and Tombs around the Decline and Collapse of the Pylian State*

The palatial society of the Greek Late Bronze Age collapsed around 1200 BC. There were signs of widespread mass destruction throughout Greece and several of the palaces and settlements were abandoned. Two of the largest palaces, however, Mycenae and Tiryns in the Argolid, showed evidence of rebuilding of houses in and around the palaces after the first major destruction fire. The century after the initial destruction of the palaces was a period of turmoil and filled with more devastating fires at the palaces. In contrast to this image from the Argolid, the post-destruction occupation of the Palace of Nestor in southwestern Greece was limited to small areas in the palace that survived the fire. Despite the lack of evidence for habitation in the area, several of the tombs, which are the primary evidence of ritual during this period, were used after the collapse. This reuse of the tombs, some of which had not been used for several generations, begs the question of the relation of ritual to the collapse of the society and its role in attempts at stability and regeneration in a period of turmoil.

[136] *Discussant***[136]** *Chair***Murphy, Tessa (Syracuse University)****[317]** *The Colony of a Colony? The Establishment of Plantations in Dominica, c. 1730–1763*

This paper draws on archival documents held in Dominica, France, and Martinique in order to trace the establishment of a plantation economy that was integral to—yet technically outside the sphere of—French colonial rule in the early modern Americas. Prior to the end of the Seven Years' War in 1763, European settlement in Dominica was formally prohibited by a series of treaties. Yet surviving notary and Catholic parish records reveal that in the middle decades of the eighteenth century, a number of families from northern Martinique established mixed subsistence and secondary export plantations in southern Dominica, thereby extending their kinship and commercial networks beyond the boundaries of French rule. These settlements, while illegal, were key to spreading and modifying practices of plantation agriculture, slaveholding, and trade already established in neighboring colonies. Adopting a micro-historical approach, the paper reconstructs the familial, social, and economic networks that linked the French colony of Martinique to the neutral island of Dominica, and argues that the labor of enslaved people in this seemingly peripheral island helped fuel the growth of the French Atlantic economy.

Murray, Jenny [216] see Cooney, Gabriel

Murray, John (University of Victoria), Daniel Stueber (University of Victoria) and April Nowell (University of Victoria)**[121]** *Hand Ax Function at Shishan Marsh-1: Preliminary Results of an Experimental Use-Wear Analysis*

Although hand axes are one of the longest lasting and most iconic stone tools in the Paleolithic, little experimental work has been done to inform archaeologists about hand ax function. The research presented here explores hand ax function using low powered microscopy and an image-based GIS approach. Thirty-two hand axes were created with chert collected from outcrops in the region surrounding Shishan Marsh-1. For the purpose of this study, the researchers focused on experiments involving subsistence activities such as butchery, plant and shellfish processing, and digging. Prior to use, the edges of the experimental hand axes were examined for knapping traces using a Wild M420 Makroskop and photographed at 72x. Blind tests were employed with instructional guidelines to help standardize recording procedures and increase the accuracy of the methodology. The results of the edge damage distribution analysis of the prehistoric hand axes were then compared with the results of the experimental collection. This research has implications regarding hand ax function, hominin tool use in a desert refugia, and provides future directions in experimental protocol.

Murray, Sarah (University of Nebraska–Lincoln)**[118]** *New Technologies in Feature Recording for Archaeological Surveys: Potential and Challenges*

Archaeological landscapes are complex three-dimensional environments, containing not only cadastral survey units and evidence of sites in the form of artifact scatters, but also anomalous topographical features and standing architectural remains of a variety of periods, types, and states of preservation. The time-consuming nature of careful architectural recording and the difficulty of acquiring the high-quality geodata required for a proper architectural survey in the remote countryside have long obviated the possibility of recording most of these three-dimensional features with any kind of precision or detail as part of intensive survey projects. However, recent advances in computing speeds, 3D data acquisition techniques such as lidar scanning and photogrammetry, and mobile RTK DGPS technology have made it not only practical, but relatively easy and efficient, to record architectural features with unprecedented thoroughness, speed, and accuracy in the field. In this paper I review the utility of these new methods for architectural recording in the context of survey projects, consider how they have the potential to change the way we analyze features and landscapes both in the field and in the lab, and critically examine the logistical challenges of data archiving and dissemination that such developments will entail.

Musa, Yasser [276] see Quiroz, Carlos

Musaubach, Gabriela [174] see Archila Montanez, Sonia

Musindo, Tendai Treddah [20] see Pikirayi, Innocent

Myers, Kelsey Noack [18] see DeMuth, R. Carl

Myster, James [341] see Hoffman, Brian

Nadel, Dani and Reuven Yeshurun (Zinman Institute of archaeology, University of Hai)**[332]** *A New Look at Camp Organization in Open-Air Late Pleistocene Sites in the Southern Levant*

A wealth of Late Pleistocene–Early Holocene open-air camp-sites is recorded around the world. However, in sites predating the use of stone for construction, central features such as huts and their floors are rarely preserved. Thus, the documentation of site structure and the identification of past activity areas are limited to hearths (when preserved) and their environs, and to distribution patterns of cultural remains. The focus of this paper are selected sites from the Mediterranean Levant, analyzed on two levels, namely, the camp level (general size and layout) and the feature level (type, size and contents of floors, hearths, etc.). The case studies used here include Ohalo II (ca. 23 ka, no stone construction), Neve David (ca. 16 ka, some stone construction), and el-Wad terrace (ca. 15–13 ka, intensive stone construction). The analysis results illuminate some changes through time, with certain

innovations in each period. By ethnographic analogy, we suggest that the observed changes show local continuity on the one hand and increasing cultural complexity with reduced nomadism on the other. Thus, our results provide new insights into the cultural process leading to the establishment of permanent settlements and later to the formation of the first Neolithic villages.

Nadel, Dani [332] see Malkinson, Dan

Naganuma, Masaki [330] see Hirasawa, Yu

Naglak, Matthew (University of Michigan) and Parrish Wright (University of Michigan)

[132] *A Roman "House"? A New Model for Understanding the Origins of the Roman Gens*

Debate concerning the development and origins of the Roman kinship group known as the gens has a long and contentious history. These questions, however, necessarily move beyond the primary textual evidence, the standard resource for such studies. Different heuristic models must be utilized to take advantage of all available data, whether it be textual, archaeological, or via ethnographic comparison. I propose the concept of a "house society" as developed by Lévi-Strauss and taken up by numerous scholars since as one useful tool. Such a consideration allows for the expansion of the concept of Roman kinship beyond the traditional genealogical focus on patrilineal relationships to other types of relatedness within the system. It also reinforces the dynamic nature of the gens as it evolves within a larger sociopolitical framework. A further benefit is the spatialization of the gens, reconnecting kinship to the physical landscape and reintroducing available archaeological data. Evidence from the community of Gabii and nearby Osteria dell'Osa reveals a social organization present in Latium which may have led to the gentilic system. Finally, this model reconnects the Roman gens with the larger world of anthropological kinship studies, allowing for more sophisticated cross-cultural comparison and hypothesis formation than currently occurs.

Nagle, Arianna (University of Victoria)

[263] *Estimating Ancient Urchin Size on the West Coast of Vancouver Island*

Archaeological remains of sea urchins along the Northwest Coast have not been a subject of concerted archaeological research, but have the potential to provide new insights into Indigenous marine subsistence practices, and the complexities of precontact First Nations' ecological roles within the marine ecosystems they inhabited. The focus of this report is to investigate the importance of red sea urchin (*Strongylocentrotus franciscanus*) size in the archaeological record at the sites of DfSh-7 (Huu7ii) and 93T (Hup'kisakuu7a) in the area that is now called Barkley Sound. I discuss the potential for preserved urchin hemipyramids (an element in urchin jaws) to predict ancient urchin body sizes. To this end, I measured a series of urchin hemipyramids and test sizes to improve on an existing regression based method for estimating archaeological specimens in Barkley Sound.

Nahil, Emmett (Boston University) and Mary Clarke (Boston University)

[392] *Maya Monument Production: Techne and the Birth of Meaning*

Analyses of sculptural practices of the Ancient Maya have centered on the final stages of production, namely the identities of sculptors, the locations of production, and the techne of sculptural practice. While the contributions of these analyses cannot be contested, there remains a poorly resolved understanding of when in the process of sculpture limestone gains its cultural significance. This paper presents data from recent excavations at a quarry workshop at Xultun where a stela still attached to bedrock was uncovered. Our analysis of this discovery provides a glimpse into the first stages of monument production, such as stone selection and removal, as well as the beginnings of cultural practices often associated with the use life of a stela.

Naithani, Mohan [18] see Means, Bernard

Najjar, Mohammad [297] see Jones, Ian

Nakamura, Oki

[211] *Rethinking Local Differences in Burial Customs in the Final Jomon Period*

Previous studies have discussed burial customs and society of the Kamegaoka culture in the final Jomon period (around 3200 to 2500 cal BP) as a single unit of similar local societies in the northern Tohoku district, extending around 220 km from north to south and around 180 km from east to west. In contrast, geographical clustering with delaunay triangulation, my new spatial analysis using GIS, reveals local scale differences in burial customs in terms of shapes of burial pits, grave goods and red pigments. As a result of the analysis, it is possible to distinguish at least 12 local units of burial custom in this district. There is an uneven distribution of jadeite beads, which are considered as an indicator of social stratification in the Jomon period, between areas. Furthermore, there are different levels of varieties in shapes of burial pits. These results imply that local societies had different levels of social inequality or complexity, and different social or symbolic meanings of burial customs, which leads me to propose an alternative understanding about local meanings of burial systems.

Nannini, Nicola [169] see Peresani, Marco

Napolitano, Matthew (University of Oregon)

[180] *Colonization of the Land of Stone Money: Resolving the Unclear Origins of Early Settlements of Yap, Western Caroline Islands*

The prehistoric colonization of remote islands in Micronesia represents some of the most significant series of diasporas in human history. While archaeological and genetic research is shedding new light on the origins and timing of what were clearly multiple and chronologically disparate entries into the western and eastern Micronesian archipelagoes, many of these colonizing ventures are poorly understood. This is particularly true of Yap in the Western Caroline Islands. Unlike the Palau and the Mariana island groups, where robust archaeological and linguistic datasets reveal a relatively clear picture of settlement between ca. 3500–2800 cal BP, limited investigation and conflicting lines of evidence archaeologically, linguistically, and paleoenvironmentally, have resulted in significant gaps in our understanding of human settlement in the western Pacific. Identifying sites in Yap pre-2000 BP, alluded to by paleoecological data, has great potential for altering existing models of colonization and long-distance interisland interaction in Remote Oceania. This paper presents the results of the first systematic archaeological survey on Yap dedicated to identifying evidence for colonization.

[180] *Chair*

Napolitano, Matthew [4] see Hill, Mark

Narvaez, Jose**[270]** *Precolonial Irrigation Systems and Settlement Patterns in the Valley of Rimac, Peru*

This investigation is an archaeological analysis of the lower Rimac River Valley, located in the Peruvian Central Coast, where several irrigation channels that were originated from the river allowed the cultivation of a great extension of land in this valley. The objectives of this study were to establish the occupation sequence and settlement pattern in those artificial valleys in precolonial times and their relation with this irrigation system. Modern and old maps and aerial photos were used in order to examine and make a map of the area before the modern expansion of the city during the twentieth century that destroyed the precolonial irrigation systems and numerous archaeological sites. The investigation also comprised the analysis of colonial documents from the sixteenth to the early nineteenth centuries, trying to establish the political and territorial organization of the indigenous population in the late precolonial period. Part of this investigation was submitted as a PhD thesis at the University of Calgary in 2013.

Nascimento, Luis Renato [384] see Miller, Paul R. M.

Nash, Carole (Geographic Science, James Madison University) and Heather Wholey (Anthropology and Sociology, West Chester University)**[224]** *Climate Change and the Predicament of Archaeology in the U.S. Middle Atlantic Region*

The U.S. Middle Atlantic region, known for its rich archaeological record and diverse topographic settings, is experiencing a range of climate change impacts: sea level rise and coastal erosion; increased precipitation and flooding in some areas; and mountain-based forest fires associated with drought in other areas. Documented paleostratigraphic and palynological studies throughout the region provide a record of late Pleistocene/Holocene environmental response to changing climate, confirming observations from other disciplines that the magnitude of modern impacts exceeds past temporal and spatial patterns. The corresponding impact on archaeological resources is great, requiring a renewed effort to document threatened sites while also working with local and state governments to develop mitigation strategies. The Middle Atlantic Archaeological Conference (MAAC) has supported the creation of the "Climate Change Response Network for Mid-Atlantic Heritage Resources," which acts as an online archive of survey and salvage projects. A result of this project is the recognition that archaeologists in the region have monitored sea level rise for decades, their work providing a unique framework for the modeling and prediction of future impacts. The network highlights the predicament of archaeology in this time of climate change: accelerated research and discovery in the face of catastrophic loss.

Nash, Donna (UNCG) and Patrick Ryan Williams (Field Museum)**[136]** *Why Did They Leave? The Wari Withdrawal from Moquegua*

In Moquegua the monumental provincial center of Cerro Baúl was ritually abandoned circa 1050 CE. It is at this time that Wari affiliated occupation of the sacred summit ended and production of imperial Wari goods ceased in the region. This evidence does not indicate that the empire collapsed at this time, but instead suggests when Wari officials chose to withdraw from this frontier region. Why did they leave? In this paper we discuss the changing population dynamics in Moquegua at 1050 CE and how a number of factors may have undermined the legitimacy of Wari elites, who relied heavily on ritual and supernatural sanction to dominate the valley. We describe the nature of Wari ritual practice in previous periods and how it may have been a key strategy in Moquegua for incorporating local, subordinate elites. Yet, by 1050 CE much had changed. Settlement patterns shifted and alternative econiches became important. Tiwanaku colonies transformed and the Chiribaya polity grew. We suggest that these changes, among others, may have undermined the supernatural sanction of Wari elites and they could no longer muster the resources to maintain their colonial presence in Moquegua.

Nash, Donna [29] see Williams, Patrick Ryan

Nassaney, Michael (Western Michigan University)**[311]** *Discussant***Nathan, Smiti (New York University)****[27]** *Scrapyards, Curious Constructions, and Local Engagement: A Southeast Arabian Perspective on Building a Flotation Machine*

Since the late 1960s, flotation has been used to extract macrobotanical remains from soil. Machine-assisted flotation is a popular method; however, very few publications discuss the logistics of designing and constructing such a machine (notable exceptions include Hunter and Gassner 1998; Nesbitt 1995; Pearsall 2015; Shelton and White 2010). Flotation machines are often built in the country of research. The availability of local resources impacts the design, construction, and operation of a flotation machine. This paper aims to provide guidelines and considerations for fellow archaeobotanists and archaeologists who are contemplating building a flotation machine, while providing examples from the author's own experience in southeast Arabia, specifically northern Oman. This paper covers pragmatic considerations during the design phase, practical suggestions for sourcing material and physically constructing a machine, and, finally, discussions on the role of local engagement. Using southeast Arabia as an example, this paper explores how continuous integration of local community members into archaeobotanical research has fostered long-term and sustainable community engagement.

Nation, Humberto, Leah Minc (OSU), Holley Moyes (UC Merced) and James Brady (CSULA)**[386]** *Analysis of Culturally Derived Speleothem by INAA: An Analytic Approach to Sourcing*

The occurrence of "foreign" ceramic materials as well as the breakage and transport of speleothems during ancient Maya cave visitations have become an increasingly well-documented phenomenon (Brady et al. 1997). This phenomenon has raised several questions such as the spatial and temporal extent of these interactions, practices, meaning and specifically what does all this tell us about the relationship between Maya polities and proximal or distant caves. Geochemical analysis of geological samples by Instrumental Neutron Activation Analyses (INAA) is a very common and reliable practice. In this study we analyzed (71) samples comprised of various types of speleothems (Stalactites, stalagmites, flowstones, cave pearls) collected in various locales in Belize (Macal, Barton Creek, Pine Ridge, Roaring Creek, Cave's Branch, and Sibun Valley). Our samples came from two separate expeditions, the Belize Valley Speleothem Project provided by Dr. Holley Moyes (U.C. Merced), and Xibun Archaeological Research Project provided by Dr. Polly A Peterson. Our results indicate that INAA can be useful in profiling the variation within samples from the same cave; and the variability between different caves, thus making INAA a viable method of sourcing lithic materials

Natker, Leon**[390]** *Chupadero Black-on-White: Communities of Practice, Identity, and Memory*

Since the beginning of archaeological research, style has been used to characterize and define numerous aspects of social interaction and complexity, including communities of practice which structure ways in which elements of material culture are transmitted. The persistent transmission of knowledge through time and space implies a long lived community of practice. Chupadero Black-on-white, produced in central and southeast New Mexico, was possibly the longest lived of all the Black-on-white wares and the most extensively exchanged. Yet for all of its longevity and ubiquity in the Southwest, the design style, based on morphology and painted decoration remain constant. In this research, I conduct an attribute analysis of decorative design and morphology of Chupadero in order to assess to what degree, if any, change in style occurs. I explore the geographic dimensions of this long-term production and the long-distance exchange of Chupadero Black-on-white. I then discuss the communities of practice, collective memory, and the communities of identity implied by this long term production, which started in the late Pueblo II period. Finally, I discuss the implications of the production of this ware in the context of exchange in the greater Southwest.

[315] *Discussant*

Naudinot, Nicolas (University Nice Sophia-Antipolis—CNRS)

[389] *Understanding the Short-Term Occupations of the Late Glacial and Early Mesolithic Groups in Western Europe*

Prehistoric archaeology is now focusing on past hunter-gatherers societies behaviors and relationships with their environments. In Western France, the Late glacial and the Early Holocene were the stage of an important research dynamic. The chrono-cultural organization has been revised relying in particular on the excavation of new key sites. This research shed greater light on the human territories and paleo-economic behaviors. Understanding human mobility depends on our control of time linked directly with the sedimentary cover. Our knowledge of short-term occupation stations is limited since these sites are not easy to find (archaeological visibility) or to identify (palimpsest, multi-locii sites). Some large archaeological sites are sometimes constituted by little "locii," which can reflect short occupations. It is, however, not the most frequent configuration. Most of these short-term occupation sites have been recognized in rockshelters. Research conducted in small rockshelters of the Armorican Massif is very promising today. Limited to a few square meters, these small shelters could accommodate only limited groups for short periods. The overwhelmingly dominant production of hunting tools confirms this hypothesis. This research draws a first picture of the complexity of land use strategies between the Azilian and the Mesolithic in this European peninsula.

[227] *Chair*

Nauman, Alissa [50] see Perhay, Nathaniel

Naumann, Aaron (Colville Confederated Tribes)

[295] *Discussant*

Naumann, Elise [151] see Wong, Megan

Nautiyal, Sudhir [18] see Means, Bernard

Navarro-Castillo, Marx and Hector Neff (California State University-Long Beach)

[182] *PIN7, a Diachronic Study of a Specialized Production in Eastern Soconusco*

Soconusco, a rich ecological environment in far-southern Chiapas, Mexico, has been occupied throughout Mesoamerican history. The Proyecto Arqueológico Costa del Soconusco (PACS) focused on settlements in the mangrove zone of Eastern Soconusco. A lidar survey identified a total of 203 features thought to be associated with human activities. This paper focuses on site Pin7, which is located in the mangrove zone about 1.5 km west of the Rio Cahuacan. Magnetometer and ground-penetrating radar surveys were conducted and anomalies were found. Excavations showed that most of the mound's volume accumulated during the Late Formative period, when a series of overlapping firing features apparently used in salt production were built. There is very little domestic debris, suggesting that the mound was a specialized salt and ceramic production facility. Stratigraphic and ceramic analyses indicate that the site was abandoned during the Terminal Formative and not occupied again until the Terminal Classic. A burial in a circular pit covered mostly with Plumbate production debris may be a Plumbate potter.

Navarro-Farr, Olivia [174] see Cagnato, Clarissa

Navarro-Farr, Olivia [179] see Freidel, David

Neal, Katie, Ashley Hampton (University of Montana), Anna Marie Prentiss (University of Montana) and Thomas A. Foor (University of Montana)

[50] *Gendered Cooperation and Competition: A Multivariate Statistical Analysis of Floor Activity Patterns in Housepit 54*

Housepit 54 at the Bridge River site, British Columbia, provides a unique look at the evolution of interpersonal dynamics within a single household over time. The sequence of 17 floors evinces a wide-range of activity patterns and spatial configurations reflecting performed labor. Current theories of intra-household dynamics posit that cooperative, complimentary work should underlie individual social interactions within a single household. However from late Bridge River 2 (ca. 1300–1500 cal BP) to Bridge River 3 (ca. 1300–1100 cal BP) the village began to approach a Malthusian ceiling and such cooperation shifts in congruence with a rise in inequality, as competition for resources manifested both between households and within households as well. This breakdown in cooperation potentially had wide-ranging effects on the social life of individuals and possibly created new avenues for the gender division of labor. Multivariate statistical analysis is performed in order to understand the association between cooperative or competitive behavior and activity area variation. In addition, a framework of gendered labor is overlaid to see if gender relationships also shifted from cooperation to competition. By studying these interactions, a more thorough understanding of the interplay between resource availability and social adaptation at the household level is illuminated.

Neal, Mark [300] see Perry, Jennifer

Nebbia, Marco (Durham University)

[76] *Early Cities or Large Villages? Settlement Dynamics in the Trypillia Group, Ukraine*

During the fourth millennium BC a number of considerably big settlements have developed in the territory of modern Ukraine, thus constituting the biggest sites in Europe at that time. Mostly investigated only as single entities these “megasites” have never been considered thoroughly as part of the whole landscape of Trypillia settlements. Some scholars have argued that these could have been examples of early formed urban centers (aka “proto-cities”), others, instead, proposed that these were big villages without a clear social hierarchy visible in site organization and structure. This paper will present the spatial quantitative analysis of the whole database of known Trypillia sites and will propose a new perspective of seeing the megasites as locations for seasonal gatherings rather than permanently occupied urban-like central-places. Moreover, and more generally, the paper represents an attempt to exploit the great potential of large datasets to answer “bigger” research questions without getting lost in dry and meaningless numbers and statistics.

Needs-Howarth, Suzanne [260] see Hawkins, Alicia

Neel, Maile [100] see Thulman, David

Neeley, Michael (Montana State University) and Steven Swinford (Montana State University)

[151] *Complete Vs. Broken: Exploring Assemblage Variation in Two Natufian Sites from Jordan*

Archaeological sampling of lithic assemblages is an important process for characterizing the makeup and range of variability of these materials. These characterizations often focus on complete pieces due to the greater number of variables that can be recorded and the uncertain utility of incomplete data. But do complete pieces adequately characterize assemblage variability? Are these samples capturing the same range of variation found in broken pieces (e.g., proximal pieces)? This paper explores variation in metric measurements (e.g., width, thickness) of blades/bladelets from two Late Natufian sites in west-central Jordan. First, we attempt to address the question of how many pieces are necessary to encompass the range of variation within the assemblage (a sampling problem). Should assemblages be sorted or stratified by certain variables beforehand or are random samples sufficient? Second, are measurements of complete and proximal pieces representative of the same population or does a focus on complete pieces yield a sample population significantly different from the proximal blade population? Preliminary results indicate differences between the two samples and we address the ways in which assemblage characterizations can be biased by sampling and a focus on limited classes of material.

Neff, Hector (California State University–Long Beach), Sachiko Sakai (California State University–Long Beach), Brendan Culleton (Penn State) and Douglas Kennett (Penn State)

[182] *Late Formative Through Early Classic Occupation History in Eastern Soconusco*

Deposits in the mangrove zone south of Izapa have abundant debris from salt and ceramic production, consistent with pyro-industrial specialization based on fuel wood and other resources. These archaeological deposits are also relatively intact, and thus they offer the opportunity to test hypotheses about demographic trends derived from more chronologically ambiguous deposits of the coastal plain and piedmont. A regional demographic bottleneck has been suggested for the Early Classic, when survey data indicate virtually no one was living on the coastal plain. This contraction may have started even earlier, since prevailing interpretations suggest a peak in monumental activity at Izapa during the Late Formative, with no new sculptures erected during the Terminal Formative. In the mangrove zone, demographic contraction seems to begin around AD 1, and there is very little use of the zone during Early through Middle Classic times. Thus, the trajectory of industrial activity on the lower coast seems to follow Izapa and coastal plain population trends. This paper presents stratigraphic evidence, chronometric dates, and ceramic data that support this interpretation of the Late Formative through Early Classic occupation history.

Neff, Hector [81] see Lohse, Jon

Negishi, Yo (Akita International University)

[211] *Transformation of the Jomon-Era Ritual System: A Case Study of the Jomon/Yayoi transition in the First Millennium BC in the Tohoku Region of the Japanese Archipelago*

It has long been claimed that the Jomon-era cultural and ritual system was probably replaced by a new early farming cultural system (Yayoi Culture) brought by immigrants from the Korean peninsula. Recently, however, Japanese archaeologists have been working to determine the variability of ritual practices in each region of the Japanese archipelago. This paper analyzes the transformational process of ritual items (e.g., clay figurines and stone implements) of the Tohoku (northeastern part of main Island) region in the first millennium BC, in which the Jomon cultural ritual system entered its final phase on the main island of the archipelago. Based on this case study, I am proposing a revised model of the social process which transformed the ritual system from that of a hunter-gatherer to an agricultural society.

Negrino, Fabio [389] see Riel-Salvatore, Julien

Negus Cleary, Michelle (University of Sydney AUSTRALIA) and Elizabeth Baker Brite (Purdue University)

[25] *Kalas and Urbanism in Western Central Asia*

Kalas (qalas), as iconic fortified enclosure sites, were nodes within dispersed and low-density settlement patterns of Central Asian oases. The largest kalas functioned as the equivalent of urban centers for mobile, agropastoral societies. A complex and diversified system of agropastoral subsistence and production strategies were employed within the oases in response to extreme climatic and environmental conditions. This paper will focus on the transition from the Late Antique to Early Medieval periods in the oasis of Khorezm that saw major changes occur in the Khorezmian settlement pattern. Kala sites were abandoned, some were reused for different activities, and new kalas were established on smaller scales. The hydrological system underwent major changes, with some new areas of the oasis being occupied. There were far fewer large enclosure sites, and this period saw a modification of the kala as a type and the beginnings of centralized urbanism with the Arab conquests of the eighth century AD. Groups with different socioeconomic organization inhabited the oasis and constructed different types of sites. This paper will examine themes of permanence, tenure, abandonment, mobility, and decentralization.

Nehlich, Olaf [50] see Diaz, Alejandra

Neil, Stephanie

[361] *Moderator*

Neitzel, Jill (University of Delaware)**[59]** *Entangled Prehistories: A Physics Idea and Culture Change in Chaco Canyon*

Recent work by physicists on “entangled histories” offers archaeologists an alternative perspective for studying prehistoric culture change. The conventional wisdom of archaeology’s contribution to the broader discipline of anthropology is its ability to study change over long spans of time. In recent years, archaeologists have done this using increasingly precise dating techniques combined with processual, multi-scalar, and comparative approaches. The concept of entangled histories expands this repertoire. It says that any entity’s past cannot be described by a single chronology. Rather, the past is created by multiple chronologies intertwined with each other. This paper assesses the utility of this idea of entanglements for studying prehistoric culture change in Chaco Canyon, New Mexico.

Neller, Angela (Wanapum Heritage Center, Grant County PUD)**[150]** *Discussant***Nelson, Ben (Arizona State University)****[130]** *Discussant***[23]** *Chair*

Nelson, Ben [23] see Shepard, Lindsay

Nelson, Peter (UC Berkeley)**[17]** *Decolonizing Archaeological Methodologies: The Making and Remaking of Research Practices with Tribal Communities*

Archaeological research has traditionally been a top down scientific process of knowledge production with little involvement from the descendant communities whose cultural resources and heritage are under investigation. With the incorporation of feminist, postprocessual, postcolonial, and Indigenous theories in archaeology, the discipline has become more accessible and accountable to publics and communities outside of the specialists who conduct archaeological research. In this presentation, I will outline the approach to Indigenous archaeology that I developed in collaboration with the Federated Indians of Graton Rancheria for my dissertation research at Tolay Lake Regional Park. This approach involved establishing and adhering to core research values and working with tribal committees to ensure that the research is relevant and worthwhile to the tribe. I will show through this case how research that is coproduced with Indigenous communities can lead to richer understandings of the past and how the products of this research can positively impact the lives of many different peoples today.

Nelson, Shaun (Utah National Guard)**[362]** *Discussant*

Nelson-Harrington, Martin [46] see Dodrill, Taylor

Neri, Francesca [375] see Fournier, Cory

Ness, Kathryn [234] see Perez-Juez, Amalia

Neudorf, Christina (Hakai Institute and University of the Fraser Valley), Nicole Smith (Hakai Institute), Dana Lepofsky (Department of Archaeology, Simon Fraser University), Ginevra Toniello (Hakai Institute and Department of Archaeology, Simon) and Olav Lian (Department of Geography and the Environment, Unive)**[47]** *Caught between a Rock and a Soft Place: Using Optical Dating to Date Ancient Clam Gardens in the Pacific Northwest*

Rock-walled archaeological features are notoriously hard to date, largely because of the absence of organic material for radiocarbon dating. This study demonstrates the efficacy of dating clam garden walls using optical dating, and uses optical ages to determine how sedimentation rates in the intertidal zone are affected by their construction. Clam gardens are rock-walled, intertidal terraces that were constructed and maintained by coastal First Nation peoples to increase bivalve habitat and productivity. These features are evidence of ancient shellfish mariculture on the Pacific Northwest and, based on radiocarbon dating, date to at least the late Holocene. Optical dating exploits the luminescence signals of quartz or feldspar minerals to determine the last time the minerals were exposed to sunlight (i.e., their burial age), and thus does not require the presence of organic material. Our optical ages suggest that clam garden walls on Quadra Island, British Columbia, were built incrementally within the last two millennia, and increased sedimentation rates in the intertidal zone by up to fourfold. The dating of rock-walled marine management features such as clam gardens and fish traps can lead to significant advances in our understanding of the intimate relationships that Indigenous peoples worldwide developed with their seascapes.

Neudorf, Christina [77] see Smith, Nicole

Neusius, Sarah (Indiana University of PA)**[61]** *The EAFWG and Multi-scale Analyses of the Use of Fauna during the Archaic Period in the Interior Eastern Woodlands*

The formation of the Eastern Archaic Faunal Working Group (EAFWG) has brought together zooarchaeologists responsible for the analysis and interpretation of a large number of significant faunal assemblages from Archaic period sites. Our collaboration has led to the preservation of nearly 60 significant faunal datasets from 21 archaeological sites in several areas of the U.S. interior Eastern Woodlands in the Digital Archaeological Record (tDAR). This collection of datasets has been integrated using tDAR ontologies, which allow us to compare and combine datasets created in different formats by different researchers. After addressing the comparability of these datasets, we are examining research questions that have broad significance to understanding the Archaic Period. Temporal and spatial variability in reliance on aquatic resources by Archaic peoples has long been noted, and differences have been attributed to environmental variability and climatic change, to patterns of population growth and aggregation, and most recently to cultural preference, practices and interaction. The EAFWG tDAR collection of datasets allows us to explore differing use of aquatic resources

as well as how these contrasts relate to potential causal factors at local, subregional, and regional scales. Our research provides important perspectives on the natural and cultural landscapes of the Eastern Archaic.

[61] *Chair*

Neusius, Sarah [61] see Styles, Bonnie

Neves, Eduardo (University of São Paulo)

[325] *Landscape Domestication during the Middle Holocene in the Tropics: New Data from Southwestern Amazonia*

There is good archaeological evidence that the Amazon basin was densely populated during the 2,000 years prior to the beginning of European colonization and that these populations promoted important landscape transformations. However, not much is known about patterns of landscape transformation during the Middle Holocene. This paper brings such data based on ongoing research on two archaeological sites in Southwestern Amazonia: Monte Castelo, a fluvial shell mound and Teotônio, an open-air deeply stratified site.

[20] *Discussant*

Neves, Eduardo [62] see Shock, Myrtle

Newlander, Khorl (Department of Anthropology & Sociology, Kutztown University)

[79] *Using Sourcing Studies to Examine Paleoindian Lithic Technological and Socioeconomic Organization in the Great Basin*

In many regions of the world, archaeologists use sourcing studies to document patterns of toolstone procurement and conveyance that, in turn, inform their understanding of prehistoric lithic technological and socioeconomic organization. This is certainly true of Charlotte Beck and George T. Jones's research in eastern Nevada, where the sourcing of obsidian, andesite, and dacite artifacts has figured prominently in their study of Paleoindian lifeways. In this paper, I briefly reflect on Beck and Jones's contributions to sourcing methods and their use of sourcing studies to examine Paleoindian lithic technological organization and mobility. Recently, I worked with Beck and Jones to develop an analytical protocol for sourcing chert artifacts in eastern Nevada, as the next step in the lithic analytical program they started thirty years ago. Thus, I conclude by describing the potential for chert sourcing studies to augment the understanding of Paleoindian lithic technological and socioeconomic organization Beck and Jones have built based on the sourcing of volcanic artifacts.

Newlander, Khorl [259] see Cannon, Danielle

Newman, Sarah (James Madison University)

[392] *First Steps and Finishing Touches: Imaging Techniques and Ancient Maya Bone Craft Production*

Although archaeology focuses on the things that endure, the means by which we study those things is constantly changing. Recent technological developments have revolutionized how we assess chronology, our abilities to identify smaller and smaller traces of organic and inorganic residues, and the ways we share our data among ourselves and with the public. This presentation details a series of imaging techniques, used alone and in combination, that reveal details of ancient bone crafting methods, often at new scales or from new perspectives. I review the contributions of microscopic and macroscopic imaging, Reflectance Transformation Imaging (RTI), and 3D modeling software (such as Agisoft PhotoScan) to understanding ancient Maya bone crafting practices. Seeing ancient things in new ways highlights not only specific production methods, but also the specialized knowledge and practiced skills required during hunting, butchery, crafting, and finishing to transform parts and pieces of animals from dietary resources to raw materials and from skeletal elements into finely crafted bone tools or ornaments.

Newman, Sarah [125] see de Carteret, Alyce

Newsome, Seth [340] see Dombrosky, Jonathan

Newton, Jennifer (James Cook University), Kate Domett (James Cook University), Siân Halcrow (University of Otago) and Korakot Boonlop (University of Leicester)

[276] *Bioarchaeological Conservation and Ethics in Mainland Southeast Asia*

This paper identifies the ethical and conservation challenges of working with skeletal remains from mainland Southeast Asia, a region including Thailand, Cambodia, Laos, Vietnam, and Myanmar. Due to the increasing political rest experienced over the past decades, researchers have had better opportunities to work in these countries, with relatively easier access to appropriate permissions to excavate archaeological sites. The firsthand accounts of bioarchaeological research conducted by the authors, including current field and laboratory analysis issues will be discussed. Some of the challenges within local bioarchaeological practice include the development of local expertise, limited finances, challenging environmental and storage conditions, a lack of resources and specialized equipment, and restricted access to materials and sites. These concerns can limit the methods available for the analysis of human skeletal remains in this region, sometimes hampering chances for publication with the expectation of the use of new technologies in bioarchaeology. For example, the practice of display of human remains in open-air museums, and local museums run by the local communities in Southeast Asia will be discussed. This presentation also identifies several examples of recent challenges with bioarchaeological ethics, including exporting bone samples for analyses to other international universities.

Ng, Laura

[36] *Transnational Linkages: The Archaeology of the Late Nineteenth- and Early Twentieth-Century Chinese Railroad Workers*

Archaeological studies of Chinese railroad sites in the American West tend to be site-specific and rarely position material assemblages in a global or diasporic context where both people and goods moved back and forth across the Pacific Ocean. This paper examines how transnational frameworks can help archaeologists better interpret the material culture found at Chinese railroad sites by drawing on the fields of Asian American studies and historical archaeology.

Ngirmang, Sunny (Palau Historic Preservation Office), Camilla Borrevik (University of Bergen), Calvin Emesiochel (Palau Historic Preservation Office), Errolflynn Kloulechad (Palau Historic Preservation Office) and Derek Benjamin (Palau Historic Preservation Office)

[394] Managing Cultural Resources within Protected Areas

A goal for cultural heritage management is to advance the comprehensive preservation, conservation and management of cultural resources, defined as the broad array of stories, knowledge, people, places, structures, objects, and the associated environment that contribute to the maintenance of cultural identity and/or reveal the prehistoric, historic and contemporary human interactions with an ecosystem. Involving the state and local community in regular management, activities, and projects should always be an important part of a national government's goals and objectives. Community support, or the lack thereof, can make or break a project, but public involvement benefits both the government and the community. The public often has misconceptions about what archaeology and historic preservation really entail, and utilizing local volunteers and state government representatives exposes the public to what the field is really about, helping to bridge the gap between the agency and concerned community groups.

Nguyen, Hoàng Long [271] see Huffer, Damien

Ni, Runan [26] see Cui, Jianfeng

Nicholas, George (Simon Fraser University)**[138] Curating Indigenous Heritage: Addressing Intellectual Property and Material Culture Concerns**

Significant differences exist between Western and Indigenous societies, and their respective knowledge systems, worldviews, modes of explanation, conceptions of time, and nature of material culture. Acknowledging these is essential to making sense of contemporary claims around Indigenous cultural property, especially in museum settings. For many indigenous peoples, cultural property was and is defined and enacted in daily life (objects may be animate), with distinct expectations and responsibilities for what is considered proper care of objects and information. Importantly, the division of property into "tangible" and "intangible" forms may be unfamiliar, indeed even artificial or unnatural when applied to indigenous contexts. This presentation focuses on the benefits of, but also ethical and intellectual property concerns about the display, use, storage, replication of indigenous heritage in museums, including 3D scanning and printing, "virtual repatriation," and other new technologies.

[311] Discussant

Nicholas, Ramona [17] see Holyoke, Kenneth

Nichols, Deborah (Dartmouth College)**[13] The Role of Altica in Exchange and Interactions during the Early Middle Formative in Central Mexico**

Interaction was important early in the development of complex societies during the Formative period in Mesoamerica. Despite its small size, Altica was integrated into Early-Middle Formative exchange networks as it obtained some ceramics, obsidian blades, and ornaments of exotic stone and exported Otumba obsidian that began to circulate widely at this time. There likely were other early villages within proximity to the Otumba source engaged in procuring obsidian for trade to other sites, but Altica is the only one so far identified. We discuss our multi-technique approach to composition analysis of Formative ceramics and obsidian. To place Altica in a regional context, a goal of the project is to develop a compositional data base, not just for Altica, but for the Basin of Mexico and for Central Mexico more generally. This represents one of the largest compositional studies for the Formative period in Mesoamerica. Our goal is to develop a foundation for subsequent researchers to build on.

[13] Chair

Nichols, Deborah [13] see Stoner, Wesley

Nicholson, Christopher [169] see Egeland, Charles P.

Nicholss, Brian [341] see Zych, Thomas

Nicodemus, Amy (University of Wisconsin La Crosse) and John O'Shea (University of Michigan)**[282] Regional Trade and Political Power in the Carpathian Basin Bronze Age: The Case of Pecica-Șanțul Mare (Romania)**

Pecica Șanțul-Mare (Romania) was a major trade center during the Middle Bronze Age. Its inhabitants participated intensively in regional and extra-regional exchange networks, bringing a range of utilitarian and prestige goods into the Lower Mureș valley. The quantity and diversity of imported items at Pecica far exceeds that of contemporary settlements in the region, with goods often by-passing other Mureș Culture communities along the major trade routes. Pecica also appears to have had preferential access to some valuable extra-regional raw materials, such as unworked Baltic amber and marine shell. Not only did Pecica serve as an entrepôt, but it was also a major producer and exporter of prestige items, including fine metalwork and composite ornaments prominently displayed by elites and local leaders. Control over these exchange networks was critical to Pecica Șanțul-Mare's role as a regional center, serving as a gateway community to the Lower Mureș region. However, it did not develop gradually into this major economic node over time. Rather, control of regional trade was a significant consideration for its establishment, especially for mineral resources upriver in the Transylvanian highlands.

Nicolas, Richard (California State University Los Angeles), Anthony Morales (California State University Los Angeles) and Melanie Saldana (California State University Los Angeles)**[367] Analysis of Ground Stones Found at a West-Central Mojave Desert Rockshelter Site**

CA-SBR-14 is a rockshelter site located in the South Range of Naval Air Weapons Station (NAWS), China Lake in the west central Mojave Desert. Subsurface investigation of the site has provided important contextual data that challenges previous interpretations of prehistoric use of the area. Artifacts collected include milling slabs on the surface of the site, fire-affected fragments that were recovered from subsurface test units, and three handstones that appear to have been deliberately placed with other artifacts in an unusual feature. Analysis of collected ground stone flakes provides possible evidence of ground stone manufacture. Compared with plant and coprolite data, this poster provides important insights into prehistoric food processing at the site.

Nicolay, Scott (University of California, Merced)**[68] Over, Under, Sideways, Down: Cave Shrines and Settlement in Southwest Prehistory**

Although evidence for the use of caves and earth openings as shrines in the North American Southwest begins in the Pleistocene, this practice intensified greatly after the development of agriculture. Many of the region's major shrines appear divisible into three categories: controlled shrines, to which access was restricted by surface architecture; contested shrines, which were located equidistant between two or more surface sites; and remote sites, which may have marked cultural boundaries. Cave shrines may have defined both center and periphery of settlements. If so, this practice represents another parallel between paradigms of cave ritual in the Southwest and Mesoamerica.

Nicolay, Erica

[98] *Consumption Patterns of a Pre-World War II-Era Japanese American Community on Terminal Island*

Transmigration and diaspora are topics which archaeologists have recently begun contributing to in more detail (Lilley 2004, Ross 2010, 2011). These concepts assert the fact that cultural interchange exists when immigrant or migrant communities settle in new lands, and rejects the idea of homogenization, acculturation, or complete resistance and can be addressed in archaeology via consumption. Consumption patterns, though seemingly unimportant, have the ability to shed light on almost every aspect of life: social, economic, and cultural (Deetz 1996; Praetzelis and Praetzelis 2001; Schackel 1992). Studying immigrant and migrant communities via consumption has the ability to contribute much to the theory of transmigration and diaspora and the broader understanding of immigrant and migrant communities in the United States (Voss and Williams 2008). The proposed research consists of an archaeological study of the pre-World War II-era Japanese-American community at Terminal Island in Los Angeles and investigates the Japanese-American experience in order to understand the ways this community interacted with each other and their neighbors economically, socially, and culturally.

Nicosia, Cristiano [275] see Vrydaghs, Luc

Nie, Ying (Jilin University), Dong Wei (Jilin University), Hua Zhang (Simon Fraser University), Dongya Yang (Simon Fraser University) and Hong Zhu (Jilin University)

[115] *Artificial Cranial Modifications of Human Remains from Archaeological Sites in China*

This paper explores artificial cranial deformation from two archaeological sites in China. Jilintai cemetery (2500–2000 BP) is located in Yili region, northwestern Xinjiang, and Yingpan cemetery (2000–1500 BP) is located in Yuli county, northeastern Xinjiang. A total of 253 crania (202 from Jilintai and 51 from Yingpan) were examined in this study. Crania were measured according to the Standards Book, and 11 angles and 6 indices were calculated. Statistical analyses include discriminant function analysis and the one-way ANOVA test. The results show that 23 crania (female = 10, male = 13) were modified in Jilintai sample. In contrast at Yingpan, 22 crania (female = 15, male = 7) were deformed. The interpopulation comparison shows that all crania from both sites exhibited circumferential modification, indicating a similar cultural tradition. The significant differences between modified and unmodified crania were on measurements of cranial length and breadth, and angles of the vault, while there are no significant differences in facial morphology. The intra-population comparison suggests that generally females display more pronounced deformation than males. In addition, individuals with deformed crania possess more prestigious burial goods, especially females, than those with normal cranial morphology. This may suggest that individuals with deformed crania enjoyed higher social status in their community.

Nielsen, Axel (CONICET Argentina)

[134] *In the Middle of Nowhere: Internodal Archaeology and Mobility in the Southern Andes*

"Internodal archaeology" contributes to research on social processes through the study of the areas between nodes, i.e., places where human activities tend to cluster (sites or densely settled areas, depending on the scale). By focusing on the material traces directly generated by people's movement, this approach holds great potential for addressing questions regarding who traveled across regions and why. These possibilities are illustrated through research conducted in three internodal areas of the Atacama Desert (the coastal stripe, the Upper Loa River, and the high Andean lakes). It is argued that interregional mobility during late prehispanic times involved—at least—three practices with different agents, i.e., coastal individuals visiting the interior, local and foreign pastoralists traveling with caravans in different directions, and task groups from communities of the Loa river basin moving to the high puna in the summer. We discuss here the goals and archaeological signatures of each one of these mobility patterns.

[65] *Discussant*

Nielsen, Axel [88] see Capriles, José M.

Nielsen, Jesper (University of Copenhagen)

[288] *An Army of Winged Souls: Butterfly Iconography in Teotihuacán*

In no other culture in ancient Mesoamerica do we find butterflies represented as frequently as in the iconography of the central Mexican metropolis of Teotihuacán (c. 0–600). Appearing in mural art, painted on stuccoed tripod vessels and in the shape of clay adornos attached to incense burners, these winged creatures undoubtedly held a special place in Teotihuacán worldview and religion. Interpretations of butterfly symbolism at Teotihuacán is often based on analogies with Late Postclassic Aztec culture, emphasizing the belief that butterflies are related to the souls of deceased warriors. In this paper I examine Teotihuacán butterfly iconography in the perspective of one of the greatest natural wonders of the Americas—the yearly return of billions of monarch butterflies to the central Mexican highlands—and I suggest that this spectacular phenomenon played a central role in the initial development of the idea of the transformation and return of the dead in the shape of butterflies.

Nielsen, Jesper [119] see Coltman, Jeremy

Nielsen, Kristina (University of California, Los Angeles)

[347] *Aztec Aesthetics: Historical Reconstructions and Contemporary Cultural Recovery Movements*

Since the 1960s, Mexicayotl communities—or communities focused on Mexican Indigenous revivalism—have pursued an Indigenous cultural recovery. In the United States, these efforts have gained traction among Danza Azteca communities who increasingly employ prehispanic flutes, rattles, and other Mesoamerican instruments in their rituals and performances. Danza Azteca communities have drawn on lines of inquiry that parallel those of Robert Stevenson (1968:17, 18), including the study of archaeological artifacts; the study of texts, documents, and iconography from Central Mexico; and the study of contemporary practices in Indigenous communities that are viewed as survivals from prehispanic times. In this paper, I outline contemporary methodologies employed by these communities that have resulted in discourses parallel to those in music archaeology. Drawing on nearly two years of fieldwork with the Los Angeles Danza Azteca community, I examine the intersection of reconstruction as an academic historical study vis-à-vis recovery. This paper offers insight into the growing phenomena of an "Aztec aesthetic" and highlights shared challenges faced by archaeologists and Danza Azteca communities.

Nielsen-Grimm, Glenna, Richard Terry (Professor Emeritus of Soil Science, Dept. for Plan), Bryce Brown (Brigham Young University), Deanne Matheny and Ray Matheny (Professor Emeritus, Department of Anthropology, Br)

[229] *Residue Analysis for Cacao in Southeastern Utah Ancestral Puebloan Ceramics, Montezuma Canyon, Utah*

In 2009, theobromine, a biomarker for Theobroma cacao, was found and reported in an analysis of cylindrical vessels from Chaco Canyon, New Mexico (Crown and Hurst 2009). Washburn's positive results from ceramics recovered from Brew's excavations at Alkali Ridge, Utah (Washburn et al. 2013) dating to the Pueblo I period, pushed the time depth of cacao use centuries earlier than the findings from Chaco Canyon. They suggest cacao was brought from the south as a journey food and later used as a food drink (Washburn et al. 2013:2012). They found theobromine/caffeine signatures in Abajo Red-on-Orange and other ceramics. Recent research (Crown et al. 2015) suggests the prehispanic Southwest use of cacao and holly-based drinks. Since 2013, we have tested ceramics from excavated locations in Montezuma Canyon, Utah, and an early collection of whole vessels from the Natural History Museum of Utah. We have positive results from residue tests of gray ware vessels, black-on-white bowls, redware bowls, and mugs. We believe we have developed procedures that address contamination of objects selected for residue analysis. Implications of this research are useful to researchers considering trade with, and influence of, prehistoric Mexican cultures on prehistoric Southwest populations.

Niespolo, Elizabeth (UC Berkeley), Warren Sharp (Berkeley Geochronology Center), Christian Tryon (Department of Anthropology, Harvard University), Tyler Faith (School of Social Sciences, University of Queensland) and Todd Dawson (Department of Integrative Biology, UC Berkeley)

[371] *Using C and N Stable Isotopes in Ostrich Eggshells to Develop Paleoenvironmental Records for Late Pleistocene East African Rockshelter Sequences*

The Middle to Later Stone Age transition in East Africa ~30–60 ka has been hypothesized as a response to increased resource risk due to cooler, drier Late Pleistocene environments with greater short-term variability. Local paleoenvironmental records are needed to test such hypotheses. Ostrich eggshell (OES) fragments are common in African archaeological sequences, are amenable to ^{14}C and U-series dating, and their $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values are known to correspond to the C isotopes of vegetation and mean annual precipitation, respectively. Here we show that primary stable isotope compositions are preserved in dated OES from GvJm-22 rockshelter at Lukenya Hill, Kenya, and Kisese II, Tanzania for at least 50 ka. Mean $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values from ~14–3 ka at both sites indicate wetter environments during the African Humid Period, as expected. Prior to 14 ka, mean $\delta^{15}\text{N}$ values at Lukenya Hill show an overall wetting trend for the past ~50 ka, while at Kisese II, precipitation oscillated, with a dry period during MIS 2. These results suggest distinct paleoenvironmental trends through time at sites separated by only ~300 m elevation, 3° latitude, and 350 km distance, suggesting a more complex mosaic of environmental change in the area than regional/global records resolve.

Nieto, Rubén (Universidad Nacional Autónoma de México)

[145] *La cerámica engobe naranja grueso de Santa Cruz Atizapán: Examen integral de un indicador arqueológico del intercambio durante el Epiclásico (ca. 650–900 dC)*

Durante el periodo Epiclásico, la cuenca del Alto Lerma experimentó una intensa interacción con distintas regiones, que le permitieron acceder a materias primas y productos necesarios para la subsistencia. Entre los productos que se han reconocido como evidencia de la relación señalada, destaca una cerámica que presenta características singulares como un engobe distintivo cuya superficie aparece craquelada. Se caracteriza a su vez por una pasta burda, laminada y con textura porosa y, especialmente, una gran cantidad de inclusiones de partículas de colores blanco, negro y café. Como se ha comprobado, esta cerámica se ha detectado en numerosas regiones y, particularmente, en el valle de Toluca aparece en contextos arqueológicos de los finales del Clásico y llega a su máxima presencia para el Epiclásico. Los exámenes mediante técnicas físico-químicas han permitido identificar componentes que sugieren como posible procedencia la región de Ixtapan Tonicato, lo que podría vincularla a la producción y distribución de sal.

[145] *Chair*

Nieto-Espinet, Ariadna [275] see Valenzuela-Lamas, Silvia

Nieto Ugalde, Gustavo [120] see Garcia, Alejandro

Nims, Reno (Portland State University) and Virginia L. Butler (Portland State University)

[228] *Sablefish (Anoplopoma fimbria) and Human Ecodynamics at Tse-whit-zen and the Salish Sea*

Zooarchaeological evidence from Tse-whit-zen indicates that juvenile sablefish, or black cod (Anoplopoma fimbria), played an important role in the village's economy for ~2,200 years, but sablefish is scarcely mentioned in previous Northwest Coast archaeological research. The near-total absence of this species from other coastal sites in the Salish Sea cannot be explained by postdepositional destruction, screen size, sample size, or differences in zooarchaeological identification criteria. Thus, the pattern of uneven sablefish representation is likely related to social and ecological factors, which we explore in this presentation. We make synchronic and diachronic comparisons of sablefish abundance and body-size in two well-studied contexts, including two plankhouses, to investigate the ways that sablefish fit into the economy and social life of Tse-whit-zen. We also suggest that wider patterns of sablefish representation in the Salish Sea reflect changes in the biogeography of sablefish over time.

Nimura, Courtney (University of Oxford)

[28] *Ships and Feet in Scandinavian Prehistoric Rock Art*

Scandinavian rock art was created from the Late Neolithic through the Early Iron Age. The majority of these images were produced in the Bronze Age—a period when postglacial isostatic uplift altered much of the Scandinavian coastline. Although the lexicon of rock art motifs is diverse in Scandinavia, this paper will focus on two key figurative motifs: ships and human feet. It presents results from two different studies. The first is a Scandinavian-wide GIS-based analysis that explores the distributions of ships, and considers their relationship to both the societies that made them and to changing coastal environments. The second presents new data collected during fieldwork on feet images at two sites: Järrestad in southern Sweden, and Boglösa in central Sweden. These two projects employ different methodologies, yet they can both be used to pose a series of questions regarding the meaning and potential significance of human feet and ship motifs. A wide range of ideas and interpretations are explored, from visual punning to solar alignments to relationships with the changing environment. These interpretations are then connected to other rock art in the region and to theories of Bronze Age worldviews.

[28] *Chair*

Nissen, Zachary (Northwestern University)

[187] (Re)Creating Monumental Space: The Everyday Use of Plaza Space at Aventura, Belize, from the Terminal Classic to Late Postclassic
During the comprehensive survey of the Maya city of Aventura, Belize, the Aventura Archaeology Project (AAP) identified 29 structures located within the confines of the site's largest monumental plaza, the A Plaza. While Maya plazas tend to be open places for ritual performance and/or market exchange, the structures in Aventura's A Plaza, constructed with "seemingly" no regard to the orientation and layout of the site's other monumental architecture, suggests the possibility of an alternative narrative for some Maya plazas. A preliminary analysis of artifacts recovered from the site suggests that its occupants shifted regional connections during the Terminal Classic Period (post-CE 750), from the west (the Petén) to the north (the Yucatán). These connections were maintained through the Late Postclassic Period (ca. CE 1500) and provide insight to the construction of structures within the preexisting monumental space. This paper offers a preliminary discussion of the structures located within the boundaries of Aventura's A Plaza. In doing so, this paper considers the everyday meanings of recreating or ritualizing the site's monumental space within the backdrop of the social, political, and cultural changes that are occurring from the Terminal Classic to Late Postclassic periods.

Nixon, Sam (Sainsbury Institute, University of East Anglia) and Simon Kaner (University of East Anglia)

[396] *The Arrival of Belief: Religion and Art at the Extremities of the Silk Roads, AD 500–800*

Most studies of Silk Road connections between East Asia and Europe focus on exchanges between China and the Roman and Byzantine worlds. In Japan however the eastern Silk Road terminus is regarded as Nara where the Imperial Palace gathered a wealth of treasures from Central Asia. At the other end of Eurasia, silk and Buddhist images discovered in northwestern Europe testify to the Silk Road's significance beyond its commonly-accepted western terminus. This presentation seeks to insert these outlying regions into the Silk Road narrative by focusing on Japan and the British Isles, examining the role of religion and art in the period of great trans-continental change following the collapse of Roman and Han empires. Between the sixth and eighth centuries AD, Buddhism became established in the Japanese archipelago, stimulating the coalescence of indigenous beliefs into what became known as Shinto. Meanwhile, at the other end of Eurasia, Christianity spread through the British Isles, absorbing many elements of Celtic and Saxon spirituality. The arrival of these continental religions coincided with other important changes, including the demise of mounded tombs as energy was redirected toward temple building in Japan and church building in Britain, closely related to the emergence of new nations.

Nixon-Darcus, Laurie (Simon Fraser University)

[171] *The Daily Grind: Trends in Grinding Stone Use in Eastern Tigris from 1600 BCE to Modern Times*

A morphological investigation of grinding stones recovered from the Northern Ethiopian site of Mezber revealed changes through time that likely were made to increase efficiencies. The need for efficiency may have been due to increasing needs (e.g., larger populations, an increasing reliance on grains in the diet, a desire to reduce grinding times). Through the phases at Mezber the archaeological evidence suggests a change in the quantity of grinding stones. The growing numbers of recovered grinding stones during the Middle Phase may also reflect increasing needs for the types of reasons suggested above. As the numbers decline in the Late Phase, there may have been a reduction in need for grinding, perhaps due to out migration from this rural area into more populated town areas. The grinding stones found at Mezber also reflect multifunctional tools used to grind both domestic grains and imported grains, as evidenced by different surface textures and starch grain analysis.

Niziolek, Lisa (Field Museum, Chicago), Amanda Respass (University of Michigan, Ann Arbor), Gary Feinman (Field Museum, Chicago) and Laure Dussubieux (Field Museum, Chicago)

[199] *Globalization in Southeast Asia's Early Age of Commerce and the Contributions of Maritime Archaeology*

Globalization has become a central concern of anthropology, and recently scholars have debated its definition, origins, and social implications. For example, some contend that it is a process associated with modern times while others argue that the first long-lived networks involving regular, trans-regional trade emerged between East Asia and the Mediterranean around AD 1000, and even earlier with other regions. It has become increasingly evident, based on a growing corpus of data, that long-distance economic and social interactions were very important in the ancient world in many different regions and had transformative effects on the communities involved. In this paper, we will examine current debates surrounding globalization and discuss how shipwrecks and other maritime archaeological sites can be used to investigate this phenomenon in East and Southeast Asia during the late first to mid-second millennia AD. In particular, we will highlight the Java Sea Shipwreck, a twelfth–thirteenth-century trading vessel thought to have been sailing from China to Java when it foundered in the Java Sea.

Noack, Elisabeth [169] see Smith, Geoff M.

Noack Myers, Kelsey

[127] *East Coast Canines and Culture Contact: A Multidisciplinary Approach*

On the eastern edge of North America, native canine populations were brought into contact with foreign human and canine populations in the seventeenth century. This paper utilizes multiple types of data to address the dynamics between human and canine groups in spheres of interaction evidenced by archaeological remains from multicomponent sites on the northeastern and Mid-Atlantic coasts of the United States spanning the late precolonial and contact periods.

[66] *Discussant*

Noah, Mark [41] see Pantel, Agamemnon

Nolan, Kevin (AAL, Ball State University), Mark Seeman (Department of Anthropology, Kent State University), Mark Hill (Department of Anthropology, Ball State University) and Eric Olson (Ohio History Service Corps)

[4] *Direct Comparison of LA-ICP-MS and Handheld XRF Elemental Analysis of Copper Artifacts: A Methodological Case Study in the Exploration of Hopewell Valuables Exchange Systems*

We evaluate the sensitivity of handheld X-ray fluorescence (pXRF) analysis in reliable identification of geological sources of copper artifacts with varying levels of corrosion. As part of a larger project, we analyzed 52 copper artifacts and dozens of copper samples from known geological sources with Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry (LA-ICP-MS) (Hill et al. 2016), and analysis of the same source samples with pXRF. In both of these previous analyses, we have achieved a reclassification success rate; in fact the pXRF performs better on source samples than the LA-ICP-MS when raw data are the input (Hill and Nolan 2015). Here we apply this direct comparison to artifacts from Scioto Valley Hopewell sites. Each artifact and each source sample were measured with both instruments. We compare the classification of each artifact to likely geological source group among the two methods in order evaluate the reliability of pXRF as an independent tool for identifying the likely geological source of copper artifacts in archaeological context. The ability to successfully employ pXRF on copper artifacts opens new avenues of exploration to include large and fragile objects that are not normally amenable to LA-ICP-MS analysis.

Nolan, Kevin [4] see Seeman, Mark

Nolasco Soto, Janet [225] see Favila, Mario

Noldner, Lara (Iowa Office of the State Archaeologist and the University of Iowa), Suzanne Wanatee Buffalo (Meskwaki Nation) and Johnathan Buffalo (Historical Preservation Department, Meskwaki Nation)

[341] *A Life's Story from a Single Tooth? A Discussion of the Value of Destructive Analyses*

Countless studies have demonstrated that isotopic and ancient DNA analyses of human skeletal remains can provide a valuable added layer of information to the study of past populations and their lifeways. Although improvements in sampling methods and technological advances have greatly reduced the amount of bone or enamel required, these analyses still require the destruction of human remains. Many Native American communities are opposed and do not allow sampling of their ancestors' remains for isotopic or genetic data. The University of Iowa Office of the State Archaeologist (OSA) has recently revisited this topic with its Indian Advisory Council because without these data a majority of the human remains reposed at the OSA are considered culturally unidentifiable. Approval for judicious isotopic and ancient DNA analyses, in order to identify the affiliation of remains with no other contextual information, is being sought. In response, a Native American Advisor donated a tooth for isotopic analysis to demonstrate what can and cannot be learned. This poster presents the results of isotopic analyses of the donated tooth, the donor's self-reported life history, discusses the benefits and drawbacks of destructive analyses, and most importantly, brings this topic up for discussion among archaeologists and Native American communities.

Noll, Christopher (Versar, Inc.)

[367] *An Examination of the Browns Bench Ignimbrite from the Perspective of an Archaeologist*

Archaeologists have chemically distinguished the vitreous stone of the Rogerson Formation of southern Idaho, northeast Nevada, and northwest Utah as the Browns Bench Toolstone Source. Recent geologic research into the Rogerson Formation reveals that the deposits are much more variable than archaeologists recognize. Multiple potential toolstone beds with unique properties are present within the formation. This material is referred to as ignimbrite by geologists though some of it has the visual characteristics of obsidian, while other components appear similar to rhyolite. This paper outlines the variation in position, quality, character, and chemistry of the toolstone components of the Rogerson Formation in the Salmon Falls Creek Valley. The recognition and proper identification of these Browns Bench variants may be informative to archaeologists attempting to understand lithic reduction strategies, trade and exchange, and human mobility in the intermountain west.

Nomokonova, Tatiana [340] see Losey, Robert

Nondédéo, Philippe (CNRS, France), Cyril Castanet (Université de Paris 8, France), Eva Lemonnier (Université de Paris 1 Panthéon-Sorbonne, France), Louise Purdue (CNRS, France) and Jean-François Cuenot (CNRS, France)

[131] *Preliminary Lidar-Based Analyses of Naachtun Settlement Patterns and Land Use*

Located in the northern Petén, Guatemala, the Maya site of Naachtun has been investigated since 2010 by a pluri-disciplinary French-Guatemalan team. Some of its goals aim to reconstruct the political history of the site and its spatial evolution through time, and to understand the management of local resources and the impact of anthropic activities on the landscape. Archaeological and environmental excavations and studies have been carried out in the city center and surroundings areas while a pedestrian survey has been conducted on a 2 km² zone that included the site's epicenter and its residential area. In 2016, a LIDAR survey, funded by the Pacunam Foundation and operated by NCALM has been undertaken in a 100 km² rectangular zone centered on Naachtun with the purpose of understanding the settlement patterns—in particular the "rural" settlement—at a larger scale, resource management in relation with the different bajos closed to Naachtun, and the agrarian strategies adopted out of the city center. In this contribution, we will present the first results and interpretations of the LIDAR dataset with a focus on methodological aspects and comparisons with the traditional pedestrian survey program.

Noneman, Heidi, Christine VanPool (University of Missouri) and Andrew Fernandez (University of Missouri)

[368] *Examination of Organic Residues and Tribochemical Wear in Low-Fired Casas Grandes Pottery Vessels*

Extensive ethnographic evidence of tribochemical globular pitting in brewing vessels exists throughout Africa and Mesoamerica. Current hypotheses, however, do not extend this brewing tradition into the Casas Grandes region until after Spanish Contact. Sherds of pottery vessels collected from the Casas Grandes region (AD 1200–1450) exhibit extensive pitting, which some researchers suggest is due to the fermentation of alcohol and production of hominy. To evaluate these hypotheses, we utilized experimental archaeology, microbotanical analyses, and gas chromatography—mass spectrometry (GC-MS) analyses. Ten low-fired vessels made in Mata Ortiz to proximate Casas Grandes ollas were used for boiling water, making hominy, fermenting fresh corn sprouts (corn beer), and fermenting roasted agave hearts (pulque). Microbotanical analyses, GC-MS, and tribochemical wear analyses of morphology were then performed on both these vessels and the sherds collected at 76 Draw. In particular, we determined how hominy (an alkali food, inside–out process) and bacteria and yeast-induced fermentation (e.g., *Zymomonas mobilis*, outside–in process) differentially deflate the interior wall. This research helps us better understand the mechanisms that may have resulted in the pitted Casas Grandes ollas, therefore demonstrating if brewing was occurring in this region pre-Spanish contact.

Norman, Lauren (University of Kansas), Claire Alix (Université Paris 1–Panthéon Sorbonne) and Owen Mason (INSTAAR, University of Colorado)

[144] *From Caribou to Seal: the Implications of Changes in Subsistence Focus from Birnirk to Thule at Cape Espenberg*

The widespread Birnirk culture is considered the source of the Thule and modern Inuit peoples across the arctic, based largely on legacy data from the 1930s to 1960s. Nonetheless, the archaeology of the Birnirk culture is understudied, with a 1970s archaeofaunal study near Barrow framing the culture as ringed seal specialists who depleted local seal populations and were forced to migrate northward. This proposition is called into question by our excavation of two houses in 2016 at Cape Espenberg that provides detailed evidence of Birnirk subsistence pursuits and allows comparisons with subsequent Thule occupations in the area. The focal resources for both time periods are drastically different. Dating ca. AD 1000–1250, the Birnirk faunal assemblages represent broad-based economies dominated by caribou and fox, along with seal. Just a century later, AD 1350–1450, a Thule occupation had an extreme focus on seals—over 80% of the identified fauna. The cause of this shift in resource focus is still under investigation, but may represent the immigration of Siberian peoples into Alaska. This change may also reflect the forcing of climate or ecosystem dynamics, coupled with the responses of social systems, as mediated by technology and ideology.

Norman, Lauren [144] see Alix, Claire

Norman, Neil (William and Mary), Madeline Gunter (William and Mary), Bruce Larson (NAVFAC Atlantic) and Hayden Bassett (William and Mary)

[161] *Deep Histories from Shallow Sites: Archaeological Investigations of Later Sites in Eastern Djibouti*

Today, the Afar Region of East Africa is known for barren landscapes and some of the hottest average temperatures in the world. However, archaeological and climatological evidence suggests that over the last 3 million years the region has also exhibited temperate Savanna climes. This paper presents new archaeological data that chronicles the Oldowan through Islamic periods at the eastern edge of the Rift Valley. It begins the project of describing how deep historical processes intersected with the Islamic World along the Djiboutian Coast.

Norman, Garth (ARCON, Inc.)

[301] *Mesoamerican Contact on the Southwest Northern Frontier*

Research by ARCON, Inc. over the past two decades, using multidisciplinary archaeology research tools and interregional comparative research, is bridging regional boundaries to help construct histories of ancient people. The role of cultural exchange is becoming more apparent with intellectual data for exploring the rise of high civilizations in ancient cultures. A variety of research discoveries includes ancient turquoise trade between Mesoamerica and the Southwest (turquoise trace analysis beginning with the Toltecs), the Maya 260-day calendar, astronomy observatories, geometry and standard measure in art, architecture and sacred site planning. Sites studied include Baker village, Nevada, Parowan Gap, Paragonah Village, Capital Reef, and Rochester Creek, Utah. Mesoamerican comparisons include the sites of Izapa and Teotihuacán, Mexico.

Norman, Scotti (Vanderbilt University)

[331] *Defining Identity during Revitalization: Taki Onqoy in the Chicha-Soras Valley (Ayacucho, Peru)*

Investigations into Early Colonial Period status and identity of New World indigenous people have focused on assemblages of Spanish and indigenous goods in domestic and public contexts (Deagan 2003, Rice 2012). These studies have investigated how access to new goods and foodways may have reflected status among indigenous people, or how use of these imports in specific contexts were markers of changing identities. This paper presents excavation results at Iglesiaschayoq (Ayacucho, Peru), an Inka settlement where inhabitants participated in a 1560s revitalization movement called Taki Onqoy. In this movement, Andeans rejected Spanish cultural traditions in favor of a return to local deity worship. Rather than strategically exploiting Spanish goods as a marker of status, some inhabitants of Iglesiaschayoq actively rejected these imports in order to reaffirm their indigenous identities in the face of mass death, labor demands, and religious change. Utilizing ceramic, faunal, and spatial data, I argue that the presence of Spanish goods in specific households cannot be fully understood merely as rejection or acceptance vis-à-vis resistance or accommodation. Instead, patterns of use at Iglesiaschayoq were complicated by indigenous actors who were caught between outwardly conforming to Spanish mandates while simultaneously maintaining local identity through Taki Onqoy practices.

[331] *Chair*

Norton, Holly (History Colorado)

[159] *Armchair Archaeology: GIS-ing the 1733 St. Jan Slave Rebellion*

The 1733 St. Jan Slave Rebellion in the Danish West Indies was an ephemeral event, from an archaeological perspective. Lasting only 8 months and diffused across the 20-square-mile island, the rebellion lacks a traditional archaeological signature even from battlefield methodologies. However, it is useful to apply archaeological questions to topics that are difficult to approach through dirt and shovel. This paper will discuss the application of GIS methods to analyze the slave rebellion from multiple temporal vantage points, including social conditions leading up to the rebellion, the events of the rebellion as it unfolded, and how the reorganization of the island in the aftermath of the event can be seen spatially.

Norwood, Alexandra (Arizona State University)

[353] *Formal Open Space at Teotihuacán*

The lack of large plazas at Teotihuacán has led archaeologists to claim that Teotihuacán was a city with very little public open space. There are, however, many smaller assembly areas distributed around the city. The Teotihuacán Mapping Project identified a large number of "plazas" in the city but the criteria were subjective and the data were never analyzed. I have filtered these data by applying a more formal definition of plaza than the initial field criteria used by the Mapping Project. After evaluating the public open spaces identified in Teotihuacán, I compare the level of spatial access to plazas for neighborhoods throughout the city. I also analyze the level of access residents had to markets and temples. Finally, I compare the amount of open space and number of plazas at Teotihuacán to other Mesoamerican cities to see where Teotihuacán fits in the spectrum of open space abundance and distribution in Mesoamerica. These results provide quantitative data on formal open space in Teotihuacán for the first time and will enable a broader integration of open space into examinations of both daily and ritual life in Teotihuacán.

Novak, Shannon (Syracuse University)

[31] *Corporeal Congregations and Asynchronous Lives: Unpacking the Pews at Spring Street*

This paper seeks to expose the "fallacies of synchrony" that often accompany the analysis of human remains. In approaching a cemetery, for example, we all too easily think of the bodies there as a "community," even when they belong to different generations or geographic contexts. This simple point has major implications, especially for the bioarchaeology of urban landscapes. Here, chronologically disparate elements accumulate in vast mélanges, offering innumerable examples of the "non-contemporaneity of the contemporaneous," an idea developed by Karl Mannheim (1928) and Alfred Schutz (1967) and now extended to archaeology by Gavin Lucas (2015). To escape the fallacies of synchrony and explore the shifting rhythms of city life, I turn to the case of the Spring Street Presbyterian Church in Manhattan. When the church burial vaults (ca. 1820–1850) were unexpectedly unearthed in 2006, they seemed to represent a ready-made "congregation." Yet Spring Street was actually a "catchment zone" of mingled and mangled temporalities. Though placed together in death, the bodies there had only occasionally crossed paths in life. By following some of their traces to and from the site, we may come to understand what it means to gather, work, and worship together in a society of strangers.

Novelo Pérez, María Jesús [349] see Alvarez, Socorro

Novelo Rincon, Gustavo (INAH)

[329] *La arquitectura como indicador de integración social en la región de Yaxuná*

Las investigaciones realizadas en Yaxuná y parte de su área circundante han mostrado un complejo panorama que se manifiesta en el número y variedad de asentamientos prehispánicos, así como en la coexistencia de patrones y elementos culturales de diverso origen. Partiendo de que la

arquitectura, como evidencia arqueológica, ha sido interpretada como el reflejo de la forma en que los individuos y grupos sociales conciben, organizan y construyen su espacio, en este trabajo se presenta un breve estudio de los patrones arquitectónicos identificados en el área de Yaxuná, enfatizando las características formales y organización del espacio abierto de la arquitectura, con el fin de establecer, en la medida de lo posible, el grado de interacción e integración que existió entre Yaxuná y las comunidades en su entorno.

Novotny, Anna (Texas Tech University)

[276] *Curation in the Digital Age: The Potential for Bioarchaeology*

Digital imaging and curation are increasingly accessible to and implemented by bioarchaeologists working in both academic and CRM positions. In the field, 3D scanning and lidar technology record mortuary contexts quickly and in incredible detail. These techniques make poorly preserved remains available for study that may not survive excavation intact. In a lab setting, photogrammetry and construction of 3D models of skeletal elements shows promise for augmenting and preserving teaching collections and rare materials. However, correct implementation of these techniques requires some degree of training and skill, as well as means to curate the large data files they produce. This paper will explore the potential positive and negative aspects of implementing digital curation methods for skeletal elements as well as data generated from osteological analyses. Ethical considerations will also be discussed.

Nowakowski, Joshua (California State University, Chico), Chrissina C. Burke (Northern Arizona University) and Caitlin M. H. Bishop (Northern Arizona University)

[181] *Zooarchaeological Analysis of Dog Pathology in the American Southwest: A Case for Interpreting Dogs as Companions as Opposed to Beasts of Burden*

This presentation provides an update on prehistoric Southwest dog pathologies from the Museum of Northern Arizona's curated faunal collections. Our zooarchaeological analysis of healed cranial lesions and tooth wear has not only expanded on earlier research accomplished in previous years but it has redefined the prehistoric dog's role in the agricultural Southwest. Typically, domesticated dogs are identified as beasts of burden, which has inhibited sufficient and further analysis of the relationship between humans and dogs. Our research identifies that a lack of postcranial healed fractures and tooth wear evidence for dogs consuming human-like diets indicates that these animals may have been close companions of humans. In addition, the pathologies present on these canids convey a more dynamic and complex relationship between humans and dogs in the Southwest, one that had not previously been addressed by archaeologists. By combining zooarchaeological analysis with a chronology based on associated ceramics, we are able to describe the life of dogs in the Southwest in a more holistic manner. This information allows us to expand our understanding of how dogs were treated in Northern Arizona and creates a better potential to connect archaeological research with the interests of the public.

Nowell, April (Univ of Victoria, Dept of Anth)

[121] *Middle Pleistocene Lifeways in the Azraq Oasis, Jordan*

This introductory paper to the session on research underway at the Shishan Marsh I site in the Azraq Oasis, Jordan presents an overview of the results of our paleoenvironmental, faunal, lithic and site formation analyses. A model of targeted and repeated use of the marsh is suggested. These results are situated within their historic and regional contexts and their implications for understanding the capabilities of Middle Pleistocene hominins are also considered.

[121] *Chair*

Nowell, April [121] see Cordova, Carlos

Nowell, Sarah (University of Montana) and Ashley Hampton (University of Montana)

[50] *The Bone Tool Assemblage from Housepit 54 at Bridge River*

Excavations of Housepit 54 in the Bridge River village recovered an immense amount of cultural material that has contributed to a better understanding of the lifeways of its past inhabitants. The faunal assemblage contains a number of items tentatively identified as bone tools. This poster outlines the results of research aimed at understanding the effects of taphonomic and cultural processes associated with the formation of bone tool assemblages. Implications are drawn regarding activity variation across and between floors.

Nowlin, Jessica (Center for Archaeological Research, University of Texas at San Antonio)

[166] *An Inland Response to "Orientalization": Funerary Ritual and Local Practice in Central Italy*

Greater trade and connectivity has often been associated with changes in cultural practice. This is particularly the case for the Orientalizing period for which the traditional view holds that objects, ideas and practices from the eastern Mediterranean exerted tremendous influence on local Italian communities during the eighth and seventh centuries BCE. This paper articulates the subtle differences between the presence of imported objects, changes in material culture, and alterations in cultural practice for two inland sites within the Apennine region of the Abruzzo. It examines funerary assemblages from the necropoleis of Fossa and Campovalano through multiscale bootstrap resampling of grave goods. The results show that although both communities experience increased connectivity during this period, the number of imported objects does not necessitate a change in funerary ritual. The frequent presence of imported bucchero at Fossa shows strong ties with Etruria, but the local Iron Age funerary tradition was maintained. At Campovalano, although the number of imported objects is low, local ceramics and metal wares were employed within a new funerary practice of banqueting. Through this examination of local responses within the Italian interior, it further demonstrates importance of contextualizing the impact of greater foreign contact with an understanding of practice.

Noyer, Johua [389] see Zwyns, Nicolas

Nuevo Delaunay, Amalia (Universidad Alberto Hurtado) and Javiera Letelier Cosmelli (Independent Researcher—FONDECYT #11160404)

[246] *Archaeology of Smoking Behaviors on Public Parks of Santiago, Chile*

Cigarettes are the most numerous, ubiquitous, and tolerated form of trash on the urban landscape (Graesch and Hartshorn 2014:1). This statement has special meaning in Chile, leading country in cigarette consumption in the continent, especially between women and youngsters. Current approaches in the study of this phenomenon are based on interviews, but no material study has yet been conducted. Considering the differences between people's discourses and actions, along with the abundance and high rate reproduction of cigarettes in the urban landscape, archaeology may provide an alternative approach to assess the smoking behavior(s). On this basis, it is a fertile ground for developing a study with a contemporary archaeological scope, particularly considering that the main weakness of tobacco consumption programs is monitoring. In this paper we present the results of an archaeological project targeted on the material dimension of smoking practices in public parks of Santiago. We analyze how the material information

interplays with that from interviews, socio economic statistics, and the geographical location of educational centers. Finally, we discuss how a national scale archaeological project may be implemented. FONDECYT #11160404.

Nuevo Delaunay, Amalia [143] see Méndez, César

Núñez, Lautaro [134] see Loyola, Rodrigo

Núñez Aparcana, Bryan (Universidad Nacional Mayor de San Marcos), Jorge Rodríguez Morales (Universidad Nacional Mayor de San Marcos) and Raúl Zambrano Anaya (Universidad Nacional Mayor de San Marcos)

[230] *An Andean Mountain Shrine: The Case of Balconcillo de Avillay, Huarochiri (Lima, Peru)*

One of the characteristics of ritual practices in the Andean Society is the presence of shrines in top of mountains related to local deities. These shrines formed part of ancient cultural landscapes that involved settlements, farmlands, cemeteries, and even complex road systems. Most of these ritual spaces are not regularly present in the archaeological record, yet they are frequently mentioned in ethno-historical accounts. This study presents a preliminary analysis of a shrine located in the top of a mountain between two archaeological sites: Balconcillo de Avillay and the Inka Road of Nieve Nieve–Canturillas. This shrine presents defined and complex architectural features shown by the presence of red wall painting and a large system of platforms that surround the top of the mountain. The shrine is also related with funerary structures associated with the site of Balconcillo de Avillay, a Late Intermediate site in the Upper Lurin Valley, in the Central Coast of Peru.

Núñez Aparcana, Bryan [56] see Pebe, Edines

Nunez Cortes, Yahaira [218] see Gasco, Janine

Núñez Escaldón, Elide (Instituto de Investigaciones Antropológicas Posgrado en Antropología.)

[328] *The Current Work of "Sistema de Registro Público de Monumentos y Zonas Arqueológicas e Históricas" in Mexico*

Not long ago a public register of moveable and immovable goods of Mexican cultural heritage was implemented. This system has been changed and modified to improve it. In general terms, the "Sistema Único de Registro Público de Monumentos y Zonas Arqueológicas e Históricas (SURPMZAH)" consists of an identification, description, and finally the assignment of an official number to the piece to assist in the recovery of the object if stolen. I believe the system has unsuccessfully transformed and ask the following question: Does the "Sistema Único de Registro Público de Monumentos y Zonas Arqueológicas e Históricas" actually work? I suggest some ideas:

- Should the collections be verified frequently
- Dissemination between the investigators and general public
- The Register should be realized by each of the INAH delegations of Mexican Republic.

Núñez-Regueiro, Paz (Musée du Quai Branly, Paris) and John Janusek (Department of Anthropology, Vanderbilt University)

[292] *The French Scientific Mission to South America (1903): The Controversies and Material Legacy of the First Extensive Excavations in Tiahuanaco, Bolivia*

In the context of a pluridisciplinary mission organized by the French government in Chile, Argentina, Peru, and Bolivia in 1903, archaeological excavations were conducted in the monumental site of Tiahuanaco by the naturalist Georges Courty. During his three-month stay, he conducted extensive fieldwork in the Akapana mound, the Sunken Temple, the Kalasasaya, and the Chunchukala and Putuni structures. The material corpus unearthed is estimated to consist in over 1,400 artifacts, later divided between Bolivia and France. Courty also brought back to Paris a map of the ruins and excavations, some stamps and drawings, and a set of 61 photographs. Yet he failed to publish his results. Very early on, he was criticized for his lack of rigor and the destructions on the site, leading to a black legend of the French mission that prevails up to now. Our research aims at reassembling the material archives of Courty's work, following step by step his excavations and associating his observations with the current state of knowledge. We also review the objects held at the Musée du Quai Branly and the Museo Nacional de Arqueología, in an attempt to contextualize part of the collection, with a special emphasis on stone sculpture.

Núñez-Regueiro, Paz [62] see Horta, Helena

Nye, Jonathan [284] see Zangrando, Atilio

Nyers, Alex J. (Owner and Program Director) and Loren Davis (Oregon State University)

[48] *The Search for the First Americans on Oregon's Submerged Landforms: New Methods and Upcoming Research*

Until recently, the search for Pleistocene-aged sites along Oregon's coast has been mostly limited to subaerial landforms. In 2017 however, the search for early sites will reach past the subaerial and to Oregon's outer continental shelf. These search efforts will be guided by using a GIS-based model that predicts the foraging potential of reconstructed late Pleistocene-aged coastal landscapes. We review our modeling methodology and how ecological aspects of Oregon's coastal landscapes may have changed from the LGM to 12,000 cal BP. We also discuss upcoming fieldwork activities and research goals in the study of Oregon's ancient submerged terrestrial landscapes.

Nyers, Alex J. [226] see Davis, Loren

Nystrom, Kenneth [282] see Zaro, Gregory

O'Neill, Derek (Simon Fraser University)

[252] *Mortuary Archaeology, Burial Practices, and Defining the Prehistoric Funerary Landscape on the Sunshine Coast, British Columbia*

The ancestral burial practices among the peoples of the northwest coast of British Columbia have been well studied and documented by academics, heritage resource management professionals, and the First Nation Communities. Recent systematic surveys from archaeological impact assessments within the Sunshine Coast have yielded previously unidentified funerary archaeological features including various funerary petroforms atypical to this region. My aim is to revisit and define the types of archaeological features associated with burials and funerary rites that occur within the Sunshine Coast. Using existing research and examining the results from recent studies involving mortuary archaeology features on the Sunshine Coast, and northwest coast, I aim to explore and redefine what comprises the prehistoric funerary landscape.

[252] Chair

Oas, Sarah (Arizona State University)

[317] *Plantation Environments and Economics: Household Food Practices at Morne Patate*

The dynamics of household economies provide an important window into processes of social, economic, and environmental change in plantation settings. This paper examines household food production and consumption activities and the use of local landscapes at Morne Patate to better understand the relationships between daily life, landscape use, and the broader political economic changes that influenced plantation life on Dominica over several generations of occupation. I present the results of ongoing archaeological research, particularly of botanical remains, that are associated with a variety of food related activities in households, gardens, and provisioning grounds used from the late seventeenth through mid-nineteenth centuries at Morne Patate.

O'Boyle, Robert (University Of Montana), Erich Longie (Spirit Lake Oyate, Tribal Historic Preservation) and Dianne Desrosiers (Sisseton Wahpeton Oyate, Tribal Historic Preservation)

[394] *Working Together to Save Our Culture: Creating a Tribal Register of Historical Places*

Not long ago, the Spirit Lake Oyate and Sisseton Wahpeton Oyate were a single band, part of the Dakota Nation, living in the homeland we had occupied for millennia. Manifest Destiny, greed, and racism led to war and the establishment of reservations. Over the decades, the U.S. government separated our people as they divided the land for settlement. Today, we are working together to bring our people back together based on the places that matter the most. Together the Spirit Lake Tribe and the Sisseton-Wahpeton Oyate have collaborated with Heritage Consultation Solutions, the North Dakota State Historic Preservation Office, the Montana State Historic Preservation Office, and the Iowa Department of Transportation to develop the establishment of the Tribal Historic Preservation Registers on our Reservations. A Tribal Historic Register affords us proper participation in the national and state historic preservation programs—based on recognition of tribal sovereignty and respect for tribal cultural values. Developing a tribal register give us a powerful tool in preserving our culture. In addition, it has a strong spiritual component, which takes into consideration our practices and knowledge recognizing cultural and sometimes religious significance of places, and also properly records, preserves and stores this sensitive information.

Obregón, Mauricio (Laboratorio de Prospección Arqueológica, UNAM, México) and Luis Barba (Laboratorio de Prospección Arqueológica, UNAM, Méx)

[145] *Chemical Residues in Ceramic Household Containers of Santa Cruz Atizapan Site in the Valley of Toluca, Mexico*

The results of analysis of chemical residues are presented in a set of 2469 samples of archaeological ceramic artifacts: 434 foreign vessels (Kabata 2010), 452 samples of various types of local vessels (Pérez 2002, 2009), 480 comales (Terreros 2013), 470 pots, pans, 334 cazuleas, 140 braseros, and 159 sahmadores. The containers correspond to the Late Classic and Epiclassic lakeside site occupation of Santa Cruz Atizapán, in Mexico State. Residues of protein, carbohydrates, fatty acids, phosphates, and carbonates were identified following the protocols used by the Laboratory of Archaeological Survey of UNAM (Barba, Ortiz and Pecci 2013; Barba, Rodriguez and Córdoba 1991). The analyses were registered due to the chemical enrichment resulting from normal and recurring use.

O'Brian, Kevin M.

[246] *Make History: Public Archaeology as a Way of Life*

Archaeologists, historians, and other scholars in the heritage sector share a responsibility to public interpretation, education, and the dissemination of our current understandings of the past often while challenging myths and dominant histories that clash with those interpretations. Use of dense academic jargon in archaeological publications represents a significant barrier to public engagement with our work, and narrow specializations prevent us from deploying our investigative tools to illuminate the past in our own local regions and communities. This presentation highlights ways to engage the public in our own communities through heritage tourism, school outreach, adult education programs, plant identification walks, and neighborhood archaeology projects. By literally digging in our own backyards and leveraging peer-reviewed journals, student papers, and the "gray literature" generated by local cultural resource management projects, we can educate our friends and neighbors about the value of archaeological research methods, interpret the histories and prehistories of the landscapes we inhabit, and counter the erasure of indigenous people from local historical narratives.

O'Brien, Matthew and Danny N. Walker (University of Wyoming)

[286] *Communal Hunting and Teasing Out Signs of Cooperation in the Past*

Communal hunting represents an intensification on particular prey species requiring significant cooperation and coordination, but identifying the social organization of this extinct mode of terrestrial hunting in North America leaves inquiries relegated to evidence derived from archaeology and ethnohistory. One tangible line of evidence used to identify social interaction between participants in hunting activity has been meat sharing. Yet observing meat sharing in the archaeological record has been stymied by the small scale of archaeological excavations and taphonomic processes that have destroyed faunal evidence or obscured provenience. The Protohistoric Site of Eden-Farson provides a rare opportunity to examine meat sharing practices within the context of communal hunting. Past excavations revealed at least 10 discrete households with discrete refuse discarded within each of the structures and a well preserved faunal assemblage dominated by at least 174 *Antilocapra americana*. Faunal analysis established contemporaneity among households and identified the distribution of hunt proceeds among the participating families. In addition, X-ray fluorescence analysis on 50 obsidian tools with household provenience highlights the variation in procurement of obsidian through trade or direct procurement. These independent lines of evidence provide a more complete picture of Shoshone communal hunt participation as well as its organization.

O'Brien, Matthew [186] see Surovell, Todd

Ocasio Negrón, Ramón

[289] *Reconstructing Household Units Using Census Data and Plans*

This paper will present the benefits and limitations of incorporating census data in the analysis of household units in San Juan, Puerto Rico, to archaeological investigations. The objective of this research is to study part of the population that resided in four streets, located west of the Cathedral in the capital of San Juan during 1910. The Cathedral Ward was selected with the understanding that the area was associated to elite residents since the sixteenth century. Specifically, this research is focused on studying the information recorded in the census form, which includes: professions and trades, race, nationality, family relationships and civil status. The Porto-Rico Board of Fire Underwriters plan from 1921 was used to identify the types of structures within these streets, the lot distribution, and number of stories for the buildings. By combining these sources, it was possible to reconstruct the number of families living in those streets, as well as social status. This analysis and interpretation allowed a layer of information to be added to the history of the building and the streets, which in turn can be correlated to existing archaeological data from completed projects.

Ochoa Castillo, Patricia

[293] *Contribuciones científicas de un coleccionista: Francisco Plancarte y Navarrete y el Preclásico*

Las colecciones arqueológicas del Preclásico del Altiplano Central que se encuentran depositadas en el Museo Nacional de Antropología son una fuente de información fundamental para el conocimiento de este periodo, además de ser las más numerosas y completas en su tipo, ya que incluyen tanto las que proceden de las grandes excavaciones realizadas hace décadas (aunque desafortunadamente constituyen un porcentaje menor), como aquellas colecciones que llegaron al museo por adquisiciones diversas como donaciones y compras, formas que fueron comunes y legales antes de la Ley Federal sobre Monumentos y zonas arqueológicas, artísticos e históricos (Dario Oficial de la Federación de 6 mayo de 1972), que reguló estas actividades; así como decomisos y canjes entre museos. Por lo anterior, es de gran necesidad y responsabilidad extraer la mayor información posible de estas colecciones, en este caso particular del Museo Nacional de Antropología, ya que son colecciones que forman parte esencial de nuestro conocimiento sobre el Preclásico. Un conjunto que destaca entre éstas, es la colección que atesoró el Obispo Francisco Plancarte y Navarrete, personaje nacido en la segunda mitad del siglo XIX y quien fuera pionero en el conocimiento sobre el Preclásico.

Ochoa-Winemiller, Virginia (New Jersey City University)

[281] *Ethnoarchaeology, Domesticity, and Place-Making among the Maya*

Using an ethnoarchaeological approach, this paper explores the nature of the domestic built environment of rural Yucatán. Data from four Maya communities is used to assess the various mechanisms involved in the design and use of household architecture and test the assumption of cultural continuity in Maya housing from the ancient past to modern times. Geographic Information system-based analysis revealed spatial variations in number, shape, and construction materials of structures. Assessment of qualitative data showed a pattern of bounded extended families involved in the building of structures and space organization to establish a sense of community reminiscent to the sixteenth-century Cah.

O'Connell, James [282] see Parker, Christopher

O'Connor, John (University of Oregon), Scott M. Fitzpatrick (University of Oregon), Todd Braje (San Diego State University), Matthew Napolitano (University of Oregon) and Thomas Leppard (University of Cambridge)

[32] *Measuring Human Impacts on Islands Relative to Size*

Archaeological research on islands worldwide demonstrates that initial colonists exerted substantial environmental impacts on local ecologies, ranging from the extirpation of native species to landscape modification. The degree of impact was dependent on a host of variables, including the kinds and number of introduced plant and animal species, the remoteness of settled islands, and extent of interaction between discrete landmasses. Yet, there is still much to learn about the consequences of human impact on different islands through time. Here we summarize current knowledge and analyze how ancient human impacts differentially affected islands of varying sizes across the world's major island regions of the Pacific, Caribbean, and Mediterranean. Using principles derived from island biogeography, we compiled a database of archaeological instances of impact that include: 1) extinction and extirpation rates of native biota; 2) introductions of exotic species; 3) changes in floral and faunal biodiversity; 4) cases of landscape change directly related to human influence; and 5) the triggering of trophic cascades. Our results suggest that, while broad patterns are evident, the complex, localized interplay between humans and island ecosystems is less dependent on purely physiographic factors (here, island size) and more dependent on specific cultural trajectories of regional populations.

O'Connor, Sue (Australian National University), Julien Louys (Australian National University), Stuart Hawkins (Australian National University), Shimona Kealy (Australian National University) and Clara Boulanger (Département de Préhistoire, Muséum National d'Hist)

[180] *Gone Fishing: Evidence for Wide-Ranging Marine Exploitation in the Initial Settlement of Island Southeast Asia*

"Fishing is much more than fish . . . It is the great occasion when we may return to the fine simplicity of our forefathers" (Herbert Hoover, *Fishing for Fun-and to Wash Your Soul*, Random House, 1963). In the vast oceans separating continental Sunda and Sahul are more than 17,000 islands that make up the Wallacean Archipelago. Lying to the east of Huxley's Line, these islands are characterized by unbalanced and depauperate terrestrial faunas but support some of the world's most biodiverse marine ecosystems. While permanently inhabited today the size of many of these islands would seem to preclude occupation in the absence of agriculture or translocation of animals. Here we discuss recent excavation results from Eastern Indonesia which demonstrate the technological innovations and specialized maritime adaptations which allowed wide-ranging exploitation of diverse marine resources, enabling persistent Pleistocene occupation on these small islands.

O'Connor, Sue [173] see Langley, Michelle

Oda, Reona [77] see Mathews, Darcy

O'Day, Patrick [32] see Petchey, Fiona

Odegaard, Nancy [105] see Bisulca, Christina

Oestmo, Simen [40] see Schoville, Benjamin

Oetelaar, Gerald (University of Calgary)

[393] *Natural Disasters and Interregional Interactions: The Establishment and Maintenance of Long-Distance Connections beyond the Northern Plains*

Some 7627 calendar years ago, the Plinian eruption of Mount Mazama prompted small, dispersed bison hunting groups to abandon temporarily their traditional homelands and seek refuge among their distant relatives in the east. During their stay, they established new social ties and learned new technologies such as the use of stone boiling to extract nut oils. Returning to their homeland, they adapted this technology to extract bone grease and produce pemmican. As a reliable, storable, portable, and nutritious foodstuff, pemmican provided food security for the Northern Plains groups and gave them a valuable trade good to exchange with their eastern and western neighbors. As such, this natural disaster initiated a series of practices designed to maintain and expand the social safety net instituted during a time of need. From the simple exchange of goods and information to the development of extensive trade centers, the bison hunters and their neighbors established an ever-expanding network where economic, social, ritual and historical practices evolved in tandem with local developments. The objective of this presentation is to explore these developments in long distance interactions through time.

[148] *Discussant*

Offenbecker, Adrienne (University of Calgary), Kyle Waller (University of Missouri), Jane H. Kelley (University of Calgary) and Mary A. Katzenberg (University of Calgary)

[237] *Culture Change at Casas Grandes: New Perspectives from Bioarchaeological Analyses*

One of the significant ongoing debates surrounding Casas Grandes is whether the Medio period florescence of Paquimé arose from in situ developments or external stimuli. Some scholars have attributed Medio period cultural developments to the arrival of immigrants from surrounding regions, including Mesoamerica, west Mexico, and the American Southwest, while others have suggested that Paquimé grew out of the preceding Viejo period. To address this question, we use strontium and oxygen isotope analysis to identify nonlocal individuals in the Paquimé burial assemblage, then compare this data with a number of mortuary variables, including burial location, grave type, and burial accompaniments. The results of our analysis indicate that while the majority of units at the site contain a mix of both local and nonlocal individuals, three units were distinct in that they only contained local individuals. Interestingly, these units are the most ritually, politically, and economically charged units at the site. We interpret these results as evidence for local control over prestige goods, which suggests that Medio period florescence was likely due to a combination of both internal and external stimuli.

[237] *Chair*

Offenbecker, Adrienne [237] see Katzenberg, Mary A.

Ogburn, Dennis (University of North Carolina at Charlotte)

[147] *Discussant*

Ogilvie, Astrid [77] see Hicks, Megan

Ogle, Kiona [85] see Marean, Curtis

O'Gorman, Jodie [102] see Painter, Jeffrey

O'Grady, Caitlin (Lecturer in Conservation), Nancy Odegaard (Arizona State Museum, University of Arizona) and E. Charles Adams (School of Anthropology and Arizona State Museum)

[392] *Journeys of Our Ancestors: Ceramic Colorants and Their Role in Understanding Migration in the American Southwest*

Culturally defined color, and the technology used to produce it, is a hallmark of ceramics produced in the American Southwest prior to European contact. This characteristic (among others) was utilized to initially name, define and describe archaeologically recovered ceramic wares (e.g., Colton and Hargrave 1937; Fewkes 1898; Kidder 1931; Shepard 1931). The integration of conservation science and materials science approaches to this research is crucial to reveal nuanced interpretations of cultural and artistic motivations in production, which are key features toward understanding migration—particularly as colorant chemistry is related to culture, technology and condition. Further, technological advances in nondestructive analysis—including portable XRF—enable data collection from sample sets where NAGPRA, preservation and other concerns eliminate the possibility of destructive sampling. This paper reports results used to reconstruct manufacturing technologies to fabricate visually similar colorant layers associated with Hopi Sikyatki Polychrome and other Jeddito Yellow Wares, as well as highlights the effective use of portable XRF in identifying Point of Pines Polychrome and Gila Carretas Polychrome glaze-paint technologies. They provide insight into the transmission of people, material culture and technology across the landscape.

O'Grady, Caitlin [392] see Hurst, Heather

Ohman, Alexis (College of William and Mary)

[19] *Hunting and/or Gathering: Gender and Fishing Practices in Polynesia*

Fish and fishing occupy an intersection between meat and not-meat, hunting and gathering. As such, it does not fall into a clean division of labor by gender. Fish were acquired, processed, and distributed according to distinct sociocultural and sociopolitical codes of conduct that could result in death if not properly carried out: either accidental death from ciguatera toxicity or execution as punishment for breaking kapu/taboo. Tuna is well-known to be one of the most prized animals in Polynesian culture, and as such, is often studied in attempts to add political, economic, and ritual nuance to understanding foodways patterns. However, other fish should be given analytical consideration beyond being lumped together as reef fish. The pufferfish is one of the most commonly recovered fish specimens in archaeological contexts due to the exceptionally durable nature of its mouth bones. It has also ethnographically been noted as a fish that can be "gathered" by women and children due to the ease in collection once stunned, which is a stark contrast to the tuna hunts that men embarked on. This paper seeks to engage in a discussion about gender and fishing in Polynesia via the archaeological evidence from a site on Mo'orea, Society Islands.

Oktaviana, Adhi Agus [180] see Ono, Rintaro

Oliveira, Vinicius [327] see Rocha, Bruna

Oliver, James (Penn State Univ., Dept. of Geosciences), Russell Graham (Penn State Univ., Dept. of Geosciences) and Thomas Stafford Jr. (Stafford Research Laboratories, Inc)

[227] *Protecting Our Fossil Fuel: Bone Dates, Date-Assessment Protocols, and the Need for a Worldwide 14C Database*
Large datasets of bone 14C dates are the foundation of integrative research in Late Quaternary faunal paleoecology, biogeography, paleogenetics, responses to environmental change, extinction occurrences and rates, and roles of climate and humans in the extinction process. This research requires strict date-assessment protocols including knowledge of material dated, taxon, sample chemistry, fraction dated, isotopic and C/N values. Currently, however, using 50+ years of 14C dates and implementing date-assessment protocols is difficult because a) the number of dates produced by different methodologies and technologies is large and have variable accuracy probabilities, b) date records are scattered in a plethora of publications and reports, and c) dating methods and sample characteristics remain poorly reported. Additionally, data are difficult to obtain from labs because of a) privacy agreements, b) incomplete record keeping, and c) record loss as labs close. We illustrate these difficulties and the urgent need for a 14C database and by a) noting variability in age estimates resulting from different dating methods, b) a brief critique of recent megafauna extinction research, and c) radiocarbon lab responses to information requests associated with this critique. Without a worldwide 14C database, integrative research, strict date-assessment criteria, and proper evaluation of interpretations are nearly impossible.

Oliver, Jeff (University of Aberdeen)

[207] *On Grounding "Margins" and "Marginals": With Brief Visits to the Bennachie Colony (Scotland) and New Iceland (Canada)*
Marginality is a perennial trope within the literature of settler societies. This paper is concerned with how people, past and present, become caught up with labels of "marginality," among other forms of "identity history." The theory is grounded in what are potentially conflicting ideas: one that places emphasis on fluidity and change, the other which takes a firm materialist stand. The apparent impasse is resolved by clearly identifying contexts—both material and historical—where temporary stabilities are achieved in the way people relate to each other and to the things around them. Such an approach helps ground our understanding of how "margins" and "marginals"—and host of other distinctions besides—become stuck and unstuck. Our first stop is the uplands of mid-nineteenth-century Northeast Scotland, and the Bennachie Colony, where high rents and rationalized farming practices transformed wage-laborers, by turns, into "squatters" and "proletarian heroes." Our second stop is turn-of-the century Manitoba, where settlers could be singled out as "undesirables" in one context but exhibiting widely shared values in another. How can this be? The answer lies at the juncture between people and things. As ever the devil is in the detail.

[158] *Discussant*

Oliver, José R.

[327] *Communities, Practices, Identities, and Transmission in the Orinoco River Valley: Inferences and Deductions from the Perspective of Mixed/Hybrid Ceramic Technologies and Styles*

One salient feature of most precolumbian ceramic complexes/traditions defined for the Orinoco Valley (Venezuela) is the prevalence and persistence of a minority of potsherds whose technology and/or style is in sharp contrast to the remaining and numerically dominant (normative) ceramic assemblage. Additionally, technological and/or stylistic elements that seem to originate or relate to separate ceramic traditions are often found "mixed" in the same potsherds or found in the same stratigraphic context. The traditional culture historic-centered, normative approach has struggled to account for such "atypical" minority wares and hybrid ceramics, usually relegating their presence to diffusion, without considering the diverse social dynamics and processes of transformation and agency entailed in "diffusion." This paper addresses the question of whether current concepts of community and "practices," and modes cultural transmission do provide a more productive and rigorous framework for the classification, analysis, and interpretation (deductions, inferences) of such persistent phenomena of ceramic hybridity, mixing, and convergence than the traditional normative cultural approach did. Underlying it all, is the question the identity (or is it plurality of identities?) of the potters and their users as expressed through ceramics.

Olsen, John [113] see Ciolek-Torello, Richard

Olsen, Sandra

[175] *Advanced Imaging of Saudi Arabian Petroglyphs: How Science Informs Art*

How petroglyph images are recorded in the field is instrumental for analysis, archiving and publishing data. Being prepared to implement multiple advanced imaging techniques provides numerous advantages. Because lighting conditions, preservation and manufacturing techniques vary from one petroglyph locality to the next, having the flexibility to apply different imaging options as appropriate greatly facilitates data retrieval. Many archaeological projects require that the bulk of the image analysis is done after returning from the field, and it may be difficult, costly, or even impossible to revisit sites, so initially capturing the maximum amount of information is critical. Keeping a well-organized digital archive when different techniques are employed is also critical. Better imagery greatly enhances the readers' comprehension of the scientist's publications. Developing a website that shares images with colleagues around the world promotes new collaborations and accelerates scientific progress. In this study, high-resolution gigapan panoramic photography, reflectance transformation imaging, 3D laser scanning, and illustration directly from digital photos using a professional pen tablet are discussed. The examples given are from an ongoing research project over much of western Saudi Arabia, where a wide temporal range is represented and styles of creating the art vary from one region to the next.

Olsen, Eric [4] see Nolan, Kevin

Olson, Jan (University of Alberta)

[80] *The Heat of the Night: Ritual Purification and Curing in Mesoamerica*

While daytime is often reserved for fairly mundane activities, most archaeological questions have focused on this time period. A wide variety of activities though cross the day into the nighttime, or occur only after dark. It is during the night when Mesoamericans re-created much of their mythology in ritualistic acts. This paper explores the use of household temazcales as nightly ritual spaces. These saunas were not only found in large communal spaces, but also in households. For what were the household temazcales used? Which goddesses added meaning to their practices? Interpretations from ethnohistoric and archaeological sources brimming with images and statements will help to elucidate these questions; fieldwork will add observational data.

Olson, Kyle (University of Pennsylvania)

[297] Formation and Transformation of Communities in Prehistoric Khorasan

This paper evaluates the previously proposed sequence of transformations in prehistoric social organization in Northeastern Iran (Khorasan) using geospatial analysis of settlement distributions. The proposed sequence begins with agricultural villages during the Neolithic and Early Chalcolithic, transitions to craft-producing towns during the Late Chalcolithic and Early Bronze Age, culminates in a process of proto-urbanization and the emergence of state-like structures during the Middle Bronze Age, and subsequently collapses at the end of the Bronze Age, resulting in the "abandonment" of the region until the Middle Iron Age. Several explanations have been invoked to explain the transitions in this sequence, including migrations, shifting long-distance trade routes, the exhaustion of productive resources and climate change. In this paper, I present the results of a settlement pattern analysis of data generated through synthesis of legacy surveys in GIS and visual inspection of satellite imagery. This analysis focuses on several key variables, including measures of site size, morphology, landform correlations, clustering, hydrological potential, estimation of territorial boundaries, and relationships to modeled transportation corridors. The results of this study help us to operationalize the concepts of "community" and "social organization" in this region and evaluate the validity of the proposed culture-historical sequence.

Olson, Samantha (St. Cloud State University)**[299] Beach Party: A Review of Previous Relict Shoreline Surveys and Excavations in the 2016 Field Season at McCargoe Cove, Isle Royale National Park**

The Relict Shoreline Survey is the longest running intensive study of ancient shorelines and beaches ever done at Isle Royale National Park. Within the five years it has been implemented, the number of known Archaic sites on the island has more than doubled. Government agencies, universities, private museums, and volunteers have all played vital roles in the success of this study. This presentation will briefly review past Relict Shoreline Surveys and elaborate on the most recent findings of the project at McCargoe Cove. The cove itself is home to the oldest precontact copper mine in North America dated to the Middle Archaic. However, up until recently, there were no known associated habitation sites from the same time period. In 2015, the Relict Shoreline Survey identified eight new sites on relict beach benches thought to be the closest temporal association to the mine. For the 2016 Relict Shoreline Excavation, two of these sites were excavated. The excavated sites were then compared to previously discovered Archaic sites on the island with a known use in order to aid in determining the function of the new sites. Information presented will be the preliminary findings and interpretations of the artifacts.

Olszewski, Deborah (University of Pennsylvania) and Brenda Baker (Arizona State University)**[54] The Later Stone Age in the Fourth Cataract Region, Sudan: Lithic Assemblage Features at ASU 09-02**

Later Stone Age (LSA) foragers in the Middle Nile Valley had relatively mobile lifeways that included use of pottery. Distinguishing LSA from Neolithic ceramics is difficult due to continuity in styles, an issue that extends to lithic assemblages. Lunate microliths and scaled pieces and use of flint and quartz as main lithic raw materials span both periods. We examine the lithic assemblage at ASU 09-02, a LSA site in the Fourth Cataract region of northern Sudan. Situated on a terrace north of the Nile River, radiocarbon dates between 10,600 and 9500 cal BP indicate occupation(s) in the earliest Holocene. ASU 09-02 also yielded ground stone tools, bedrock grinding slicks, and a cluster of 25 pits within sedimentary bedrock. Lithics were obtained from surface collection and excavation. Analysis shows that flint (58.4%) and quartz (22.9%) predominate. Results support previous observations that emphasis on blade/bladelet production (10.5% surface and 5.5% excavation) may be one characteristic of the LSA compared to the Neolithic. Slight flint and quartz patination also may distinguish lithics from the two periods. These attributes depart from the traditional way of differentiating chronological periods, which cannot be applied here due to similarities in the tool components.

Olszewski, Deborah [244] see Samei, Siavash

O'Mansky, Matt (Youngstown State University) and Arthur Demarest (Vanderbilt University)

[125] Ceramic Chronology and Current Visions of the "Terminal Classic" and Collapse in the Southern Maya Lowlands: A Brief Desultory Philippic
Recent popular interpretations have proposed that the "Terminal Classic" in the southern lowlands was a gradual transition or slow multi-stage process or that many ninth and tenth century centers continued to prosper; or even have proposed a "What collapse?" scenario. Yet systematic site by site review of ceramic chronologies and evidence reveals that these characterizations and, indeed, the whole debate are poorly informed due to errors in ceramic typologies and limited understandings of the nature and complexity of the ceramic record, especially regarding the many Fine Paste ceramic types. Site level interpretation is hindered by insufficient excavation of stratified middens and minimal lab time. This generates long, undivided and incoherently defined "Terminal Classic" phases, overreliance on "the last dated monument" and elite iconography, and selective use of disparate data, which together create a Rorschach Test for any favored model or correlation. Corrective measures require more refined ceramic chronologies and careful intersite comparisons based on reorientation of resources to middens and lab work. On a positive note, by piecing together evidence from ceramic work that does meet high standards, a more convincing picture of ninth and tenth century landscapes may be beginning to emerge from the methodological fog.

O'Neil, Megan E. (Associate Curator, Art of the Ancient Americas, LACMA)**[392] Collaborative Research on Maya Ceramic Vessels at LACMA**

This paper features the Maya Vase Research Project, a collaboration of LACMA's Conservation Center and the Art and the Ancient Americas Program, which is studying Classic-period Maya ceramics in the LACMA collection. The project's first phase was to perform digital technical imaging, comprised of photography in different regions of the electromagnetic spectrum, starting in the visible and expanding from X-rays to the Infrared, including ultraviolet visible induced fluorescence. Digital rollout photography also was done in the visible and infrared ranges, which in combination yield false-color infrared images. The research team examined the objects and technical images to determine avenues for further analysis, particularly concerning hand-building and decorative techniques. For example, conservation scientists use multiple analytical tools (e.g., XRF, FTIR, SEM, and cross-section) to examine pigments and stucco. Our research combines such study of materials and techniques with art historical, epigraphic, and archaeological analysis, considering, for instance, artists' choices of materials and manufacturing techniques in relation to the objects and images they created. We also explore how this evidence may shed light on artistic process and collaboration, relations with other media such as mural painting, and artistic innovation and exchange between the Maya region and Teotihuacán.

[392] Chair

Ono, Hiroko [144] see Fitzhugh, Ben

Ono, Rintaro (Tokai University), Harry Oktavianus Sofian (Pusat Arkeologi Nasional Indonesia), Adhi Agus Oktaviana (Pusat Arkeologi Nasional Indonesia), Sri Wigati (Balai Arkeologi Manado) and Nasullah Aziz (Balai Arkeologi Manado)**[180] Development of Maritime Networks and Human Migration in Wallacea and Oceania during Neolithic to Early Metal Ages**

The Austronesian expansion both in Island Southeast Asia and Oceania after the Neolithic times is one of the famous cases of human maritime colonization and adaptation in the world. This paper explores the evidence of Neolithic to Early Metal-aged maritime networks and maritime adaptation in East Indonesia or northern part of Wallacea based on our recent excavations in Northern Maluku and Central Sulawesi as well as some other latest archaeological outcomes in Island Southeast Asia. We summarize the excavation results, explore their implications for reconstructing maritime networks and adaptation, then also discuss the possible human colonization and interisland networks between Island Southeast Asia and the Pacific Islands mainly Near Oceania after Lapita times.

Opitz, Rachel
[312] Moderator

Orbach, Meir (University of Haifa)

[338] *The Hyena Ecology during the Late Pleistocene of the Levant: Manot Cave (Israel), a Case Study*

Manot Cave is situated in the western Galilee hills of Israel. Excavations have been conducted since 2010 in 12 different areas, yielding a rich archaeological record attributed mainly to the Early Upper Paleolithic period (46–33ka). Area D is located in the main hall of the cave on top of the western talus less than 15 m from the assumed cave entrance. The upper sedimentological layer is about 80 cm thick and contains flint items, bones, coprolites and stones. The Area D ungulate-dominated faunal assemblage was studied in detail to determine the accumulation agent/s and shed light on the occupation of the cave by humans and carnivores. No evidence of in situ human activities was identified, pointing to the presence of artifacts as a result of slope sliding. The accumulation of bones and coprolites seem to have occurred in situ by animal activities. Our taphonomic results match the Known criteria for a Hyena den: *Crocuta crocuta* bones with juveniles among numerous coprolites and high proportion of gnawing marks on ungulate bones. Therefore we suggest that Manot Cave served alternately as humans' shelter and hyena den. Following this, insights pertaining to the spotted hyena's ecology in the late Pleistocene Levant will be described.

Orchard, Trevor [176] see Patton, Katherine

Ordinario, Matthew

[113] *Artifact Density and Predictive Modeling in Old Kiyyangan Village*

This presentation explores the possibility of predicting house pad footprints in the Old Kiyyangan Village, Ifugao, Philippines by looking at the density of artifacts in upper levels of excavation units. Knowing the artifact density in upper levels would help future excavations at the Old Kiyyangan Village site when digging new units. I hypothesize that there would be a higher artifact density between 30–50 cm below datum in each trench, which are on the edges of a house platform. In addition, I also argue that there will be a positive correlation with the relative density of artifacts in the upper levels to the density of similar artifacts in deeper levels. To test this hypothesis, I used the site accession record to calculate the estimated artifact density of earthenware ceramics between 30 and 50 cm below datum. To calculate the density, I divided the total mass of the recovered earthenware ceramics in the relevant depth range by the estimated volume of sediment removed from those levels. Results of this analysis were then correlated with the presence or absence of intact earthenware ceramics—infant burial jars that indicate the center of a house platform.

Ordoñez, Maria (PhD candidate, Universiteit Leiden)

[220] Chair

Ore Menendez, Gabriela (Vanderbilt University) and Zachary Chase (University of Chicago/Brigham Young University)

[222] *From the Sky to the Andes: Intersection between Traditional Survey and Satellite Multispectral Analysis*

In recent years, the use of multispectral imagery has become increasingly important in archaeological research, site detection, and classification of site functions. As the use of these images becomes more common, we must test their accuracy in order to assess their utility and potential problems with their uncritical application. In this presentation we examine the advantages and limitations of using multispectral imagery as a general survey tool. First, we use multispectral imagery from the region of Huarochirí in the Peruvian highlands to conduct a preliminary analysis of the landscape using ENVI software to identify and classify agricultural landscape features and other archaeological sites. We then compare the results of this analysis with areal data collected through traditional pedestrian survey techniques. This methodological exercise allows discussion of the ways traditional field methods and newer technologies can complement one another and ways archaeologists can be more critical in using multispectral imagery. In the case of the Peruvian highlands, critical evaluation of the utility of multispectral imagery for reconstructing archaeological landscapes is particularly important because the highlands' difficult topography can pose challenges to traditional pedestrian survey, limiting the representation of these landscapes in archaeological research.

O'Regan, Hannah (University of Nottingham, UK)

[340] *Bears and People: From the Wilderness to Dancing*

There has been a very strong relationship between human societies and the brown bear (*Ursus arctos*) in many different places and cultures. The bear has had multiple roles in European societies, from the ancient (and modern) epitome of the wild, through religious symbol to the arenas of the Roman Empire, and their later use as entertainment. At what point does the bear's position change in society from an animal to be feared, to one to be mocked? In terms of captive management, a fully grown bear would require considerable space and food. How and where were these captive bears kept? Did they survive into adulthood, and what is the evidence for taming? These issues will be examined here using evidence from zooarchaeology, material culture, and iconography.

Orengo, Hector A. [250] see Garcia, Arnau

Oron, Maya [389] see Sharon, Gonen

Orrego, Miguel [182] see Schieber de Lavarreda, Christa

Orsini, Stephanie R.

[340] Chair

Orsini, Stephanie R. [340] see Stanchly, Norbert

Ort, Jennifer (AHS, Inc.) and Brian Robinson (University of Maine Orono)

[262] *Guess Who's Coming to Dinner: An Exploration of Lithic Tools and Sources at the Bull Brook Paleoindian Site, Ipswich, Massachusetts*
The Bull Brook Site in Ipswich, Massachusetts, is one of the largest and seemingly most spatially organized Paleoindian sites in North America. The intrasite activity patterning of flaked stone tools helped us to distinguish the site as a large aggregation of inhabitants, as opposed to small occupations taking place over time. The strong pattern of interior and exterior activity differences, or concentric rings of activity, are difficult to explain except by an organized social event. Who then occupied Bull Brook and are different regional groups represented? Analysis of artifact types and lithic materials, together with continued spatial analysis could reveal subtle patterns of rationality. We attempt this question by utilizing the metric attributes of both fluted points and end scrapers and variations in lithic material types as means to identify regional group affiliations.

Ortega, Allan (Centro INAH Quintana Roo), Rosa Maria Flores Ramirez (Centro INAH Colima) and Andrés Saúl Alcántara Salinas (Centro INAH Colima)

[183] *Life Conditions in Human Skeletal Samples from Colima and Quintana Roo, Mexico: A Comparative Analysis across Time*
Life conditions of agrarian populations in Mesoamerica changed during the cultural periods. Scholars have seen a stature decrease and a pattern of increase of the morbidity indicators across the time (Del Ángel 1996; Márquez et al. 2002). The aim of this paper is compare skeletal stress indicators between Maya (Quintana Roo) and West Mexico (Colima) settlements to evaluate life conditions, similarities and differences from 200 to 900 BC. These settlements share modes of production and weather conditions. Differences are in landscapes. We analyzed cribra orbitalia, hyperostosis parietalis, dental tartar and caries, enamel hypoplasia lines, and periostitis in tibia in adults (more than 15 years old) of both sexes by region study (Colima: two archaeological sites and 35 females and 15 males, and Quintana Roo: 18 sites, 25 females and 17 males) and by chronology (Preclassic and Classic). We conclude that Colima's Preclassic females show more indicators of unspecific infections than Quintana Roo's. During Classic times, males and females of Quintana Roo show more stressful conditions than Colima's samples. The landscapes and social organization are possible explanations for these differences.

Ortega, Edgar [337] see Hansen, Richard

Ortega, Natalie

[362] Discussant

Ortega, Verónica (INAH, Mexico)

[217] *Elementos de Prestigio en el Complejo Arquitectónico Quetzalpapálotl, Teotihuacán*
El complejo arquitectónico Quetzalpapálotl ocupa un lugar privilegiado en la Plaza de la Luna, en el centro urbano de la antigua Teotihuacán. En recientes años (2009–2013) hemos realizado una investigación enfocada a comprender el uso de los espacios y su posible asociación con la élite Teotihuacana, a través del reconocimiento de los elementos de prestigio que diferenciaron a sus ocupantes del resto de los pobladores. En esta ponencia expondremos nuevos datos respecto de la funcionalidad del complejo y su cronología, comparándolos con los de otros edificios explorados en la Plaza de la Luna, con el objetivo de obtener una visión general de los grupos que ocuparon este importante lugar y su posible relación con los grupos de poder.

Ortiz, Byron [62] see Torres, Mauricio

Ortiz, Jose Raul (University of Arizona), Takeshi Inomata (University of Arizona) and Barbara Arroyo (Proyecto Arqueológico Kaminaljuyu)

[81] *Bayesian Analysis and Chronological Revisions in Southern Mesoamerica*
The application of Bayesian analysis on radiocarbon dates from key sites in southern Mesoamerica has contributed to chronological revisions, which are leading to a reevaluation of social processes among major political centers. Main challenges in this analysis include long occupation and mixing of old carbon in construction fills; poor preservation in the tropical environment; and the paucity of short-lived plant remains. Key steps in our application of Bayesian analysis on Mesoamerican archaeology are: first, to identify and eliminate problematic dates in new and existing datasets; and, second, to test different scenarios regarding stratigraphy, radiocarbon dates, and ceramic phases in order to reach the most appropriate interpretation.

Ortiz, Laura (Proyecto Templo Mayor), Julia Perez (Proyecto Templo Mayor), Ximena Chávez (Proyecto Templo Mayor) and Emilio Ibarra (Laboratorio de Paleoetnobotánica y Paleoambiente I)

[174] *The Meaning of Plants around Death: The Case of Offering 149*
Each offer in the Tenochtitlan Sacred Enclosure is the representation of a microcosmos that can be understood through the analysis and interpretation of each one of its compounds. An important part of them are the vegetal microremains, floral remains that did not endure through the pass of the time for its own organic nature but that in the Aztec period had multiple meanings that allowed them to be an frequent material of offering. The Offer 149 is an exceptional case up to the moment, not only for the wealth of the materials, which include braziers, olive seashells, flint knives, bone awls, copal, obsidian objects, bone remains of snakes and birds. The presence of two infants decapitated and dismembered are the elements that give a relevant meaning to the discourse of the offer. The quantity and the excellent conservation state of the pollen remains, identified as part of the Chenopodiaceae polliniferous group, can be indicative of the intentional deposition of these plants that keep a strong symbolical meaning, possibly making an allusion of the child's sacrifice because it is a special consecration offer. In this paper we will present the preliminary results of the polliniferous content of the Offer 149.

Ortiz-Diaz, Edith

[135] *The Periphery Gold Production Areas of Oaxaca: Tradition and Distinctiveness*

In no other part of Mexico have been found so many gold objects as in Oaxaca. The Mixtecs and Zapotecs from central Oaxaca created amazing pieces with such great mastery as well as in the aesthetic and technological aspects. The Oaxaca artisans worked principally with gold and silver. The mineral needed in order to make these objects was relatively abundant in Oaxaca. Nevertheless, outside the realm of the Central Valleys of Oaxaca and the Mixtec area, mineral resources existed in most of the state and many groups created metal objects. One of these areas is the northern sierra of Oaxaca.

The goal of this paper is to discuss how the Zapotecs and Chinantecs of Northern Sierra adopted and developed a different metal tradition, specially focused on the creation of elite gold objects. Another aspect that will be considered is the different characteristics of the geology of the region.

[200] *Discussant*

Ortiz-Tenorio, Laura [53] see Ibarra, Emilio

Ortman, Scott G. (CU-Boulder)

[277] *Thinking Exponentially: Settlement Scaling and Archaeological Data*

Archaeologists are used to thinking linearly, where sample measures can be well-characterized by a mean, a standard deviation or a proportion. Settlement scaling theory requires us to think exponentially, where all these summary measures change with the scale of the settlement from which they derive. This sounds like a big problem, but once one gets used to it many traditional concerns about the quality of archaeological data turn out to not be all that important, and the archaeological record becomes a strong resource for the investigation of human societies as complex systems. In this paper, I consider the ramifications of thinking exponentially for the data requirements of scaling research in archaeology. I discuss issues related to the development of population proxies, the way error in measurement works at logarithmic scales, and the variety of proxies for socioeconomic rates that are potentially obtainable from archaeological contexts. I also illustrate these issues using data from across the New World. My goal is to show that typical archaeological data are actually surprisingly good, in the big picture, for scaling research.

[277] *Chair*

Ortman, Scott G. [277] see Davis, Kaitlyn E.

Osborn, Jo (University of Michigan)

[222] *A Bayesian Approach to the Interpretation of Andean Faunal Assemblages*

Zooarchaeology offers a rich source of data for exploring a number of important questions, from domestication and subsistence to ritual practices and political economy. However, issues of equifinality frequently arise, making it difficult to interpret faunal assemblages as different agents and processes may create similar archaeological signatures. Researchers are often forced to make subjective choices when suggesting preferred explanations for their data. Such approaches are subject to human calculation errors, and may also obscure the fact that in Andean prehistory, activities we consider separate were often intrinsically linked. This study draws on ethnographic, ethnohistoric, and archaeological data to construct Bayesian probabilities for distinguishing various types of faunal assemblages, including feasting refuse, sacrificial offerings, divinatory activities, and domestic middens. The models are then evaluated against a case study from Huaca Soto, a monumental Paracas platform mound. Ultimately, this paper seeks to quantify the probability of various formation processes in faunal assemblages, allowing for more accurate and transparent interpretations of Andean prehistory.

O'Shea, John [282] see Nicodemus, Amy

Osing, Natasha (University of British Columbia)

[72] *Preliminary Results from a Multi-methodological Approach on a Refuse Pit from the Middle Shang Period at Huanbei*

In the study of refuse pits from Bronze Age China, much effort has been invested in defining chronologies illustrated by ceramic typology, while overlooking the practices surrounding the usage of the pits. Our research is intended to capture and interpret depositional behaviors related to domestic ritual and social organization and transformation during the middle Shang period. We are presenting our preliminary results of a refuse pit (2016NEK0541H128) excavated at Huanbei (late fourteenth century–mid-thirteenth century BCE) in the summer of 2016. Excavation uncovered a variety of ceramic sherds and numerous animal bones, as well as two nearly complete human skeletons. Our results were obtained from a multi-methodological approach, whereby osteological analysis, coupled with statistical analysis of the pottery remains, were employed. We seek to integrate the results derived from these different methods in order to assess what was being created, employed, and deposited within this pit, which will highlight the impact of culturally contingent factors influencing daily practice.

[72] *Chair*

Osores Mendives, Carlos [331] see Hernandez Garavito, Carla

Osorio, Daniela [134] see Sepúlveda, Marcela

Osorio Sunnucks, Laura (Museum of Anthropology, University of British Columbia) and Priya Swamy (Tilburg University, Department of Culture Studies)

[106] *Senses of Space: Religious Aesthetics as Heritage among Maya Speaking Christians in Yucatán and a Hindu Diaspora in Amsterdam*

Ethnography and ethnoarchaeology have been central to the rich development of research on multisensorial experiences of religion across cultural contexts (Meyer 2005; Moors 2005; Chao 2008). This paper will concretize the links between these religious experiences and strategic group making by presenting two cases; a Hindu diaspora in Amsterdam and Maya speaking Christians in Yucatán, Mexico. In Santa Elena, Yucatán, Mayaness is contested through tensions between various Christian denominations and culturally specific Maya conceptions of the relationships between space, materiality and personhood. The ways in which other forms of sensing, specifically in the engagement with precolumbian heritage remains, will be shown to contribute to the marginalized position of Mayaness within dominant cultural spaces. Within a Hindu diaspora in the Netherlands, 'correct' sensorial experiences of Hindu heritage become central to acts of protest in their campaign against the cultural and neo-colonial appropriation of the spring festival of Holi. We will explore the intersection between the creativity of religious thought (the symbolic world) and the politics of strategic group-making, alongside the implications of this discussion for indigenous and minority heritage management.

[106] *Chair*

Ossa, Alanna (SUNY Oswego)

[10] *Mapping the Development of Commerce: Social and Economic Processes in Middle Postclassic Period Sauce, Veracruz, Mexico*

This study analyzes the spatial patterns of ceramics from 65 archaeological residential inventories from the center of Sauce and its hinterland to address the appearance of markets and the spatial structure of exchange during the Middle Postclassic period (AD 1200–1350) in south-central Veracruz, Mexico. For Postclassic Mesoamerica, the collapse of the Classic period states is identified as a factor in market development. However, economic

development is rarely the result of a coherent strategy either on the part of managing elites or consumers. Instead, a combination of strategies and overlapping exchange systems provide the context, rather than any one explanation, for how commercial market exchange develops. Analysis of Sauce's households identified both the exchange mechanisms and their spatial organization. Results support market exchange of most ceramics for households, lending strong support to commoner household prominence in developing local markets. The restrictions of a few ceramics to Sauce and wealthier residences describe political and social inequalities. The analysis also identified socially important residences located away from the center, and ceramic types which had special social significance. In putting social relationships, consumption, and settlements into relational frameworks with archaeologically distinct residues, modeling the generative processes behind socioeconomic changes becomes accessible using familiar data.

Ossa, Alanna [335] see Gregory, Andrea

Ostapkowicz, Joanna (World Museum, Liverpool), Emma Slayton (Leiden Universiteit, Leiden, Netherlands), John Pouncett (University of Oxford, Oxford, UK), Alice Knaf (Vrije Universiteit, Amsterdam, Netherlands) and Gareth Davies (Vrije Universiteit, Amsterdam, Netherlands) [133]

Lucayan Connections: Core and Periphery in the Bahama/Turks and Caicos Archipelago

Of the many islands of the Caribbean, the Bahamas and Turks and Caicos—together comprising the Lucayan archipelago—were settled relatively late, seeing seasonal to permanent occupation from ca. AD 600 to 1000. A uniquely Lucayan material culture quickly emerged, from Palmetto ceramics to a distinctive style of wood carving (i.e., duhos/ceremonial seats). While rich in many resources, the Bahamas/TCI are strictly limited in others, notably the absence of hard stone in a purely limestone environment. Imports of lithic materials from the larger islands were important for day-to-day activities and eventually may have come to act as status and prestige markers. This paper introduces project SIBA (Stone Interchanges within the Bahama Archipelago), a new study focusing on Lucayan stone exotics, and how they reflect networks connecting the Lucayan archipelago to the neighboring Greater Antilles (e.g., Hispaniola, Cuba). Travel costs are explored using a preliminary GIS-based seascape model, which seeks to provide an independent baseline for the most probable interisland connections, both within the archipelago and between it and the larger islands. The position taken here places the Lucayan archipelago as the core, with peripheral socioeconomic/political connections to the larger adjacent islands.

Ostapkowicz, Joanna [69] see Snoeck, Christophe

Oster, Mary [273] see Freeman, Jeremy

Osterholt, Amber (University of Nevada, Las Vegas)

[185] *Life and Death among the Late Fort Ancient: Injury Recidivism and Perimortem Trauma at Hardin Village, Kentucky*

Hardin Village is a Fort Ancient site located less than half a kilometer from the south bank of the Ohio River. It was excavated under the auspices of the Works Progress Administration in the late 1930s. The skeletal remains from the Late Middle and Late Fort Ancient Periods (AD 1450–1675) represent more than 300 individuals, both male and female, aged neonate to 60+ years. Adult individuals presented a range of possible cranial and post-cranial trauma, including blunt force, sharp force, and possible projectile trauma. Several individuals show evidence of repeated blows to the head and other body parts, possibly indicative of episodes of interpersonal violence. In contrast, juveniles with age estimations of less than 18 years show no evidence of violent trauma to the skeleton, suggesting that they were not likely to be targets of interpersonal violence. The results of the skeletal analysis at Hardin Village show repeated episodes of violent trauma that were often nonlethal, but which may have caused severe injury and potential disability among the adult survivors.

[185] *Chair*

Osterholtz, Anna (Mississippi State University/Cobb Institute of Archaeology)

[139] *Discussant*

Osterholtz, Anna [294] see Lucas, Virginia

O'Sullivan, Aidan

[380] *Medieval Fish Weirs in Britain and Ireland: Exploring Practice, Power, and Identity among Fishing Communities*

Medieval wooden and stone fishweirs are among the most spectacularly preserved evidence for fishing practices among riverine and estuarine communities in Britain and Ireland. Recent archaeological surveys and excavations have traced their types of construction, forms, uses, and biographies across time, and increasingly sophisticated means of dating them has enabled us to identify patterns in their repair over relatively short periods of time (i.e., years and decades). This paper will use recent archaeological evidence to explore how practice, community and identity played out among fishing communities in Britain and Ireland, from the fifth to the fifteenth centuries AD.

Oswald, Dana B. (Prescott College)

[239] *Moderator*

[239] *Discussant*

Otárola-Castillo, Erik R. (Purdue University), Jesse Wolfhagen (Stony Brook University) and Max Price (Harvard University)

[181] *ZooaRch: General Audience Release of an R Graphical User Interface for Zooarchaeologists*

Zooarchaeologists evaluate fundamental and challenging questions about human nature. Many of these questions are answered through statistical modeling and hypothesis testing. However, statistical software tailored to answer zooarchaeological questions remain unavailable. To alleviate this problem, in 2016, we unveiled "zooaRch," a statistical software designed with zooarchaeological statistical problems in mind. ZooaRch is a Graphical User Interface (GUI) for Zooarchaeologists who wish to conduct analyses using the R statistical computing language. As such, zooaRch is open source and freely available to users. Here, we present the general audience release of the software. Following further development and pre-release testing, we increased the program's stability and diversity of statistical tools. The current version of ZooaRch allows users to conduct a suite of common and specialized analyses including univariate statistics, "analyses of bone counts by maximum likelihood" (abcm1), spatial statistics with GIS capabilities, multivariate, geometric morphometrics, and incipient Bayesian analyses. Moreover, zooaRch can display the underlying R-code. Beginning users interested in learning the R programming language will therefore experience an easier transition to the R computing environment. With this release, the zooaRch GUI makes the statistical power of the R language accessible to zooarchaeologists in research and teaching contexts.

Otárola-Castillo, Erik R. [191] see Hawkins, Hannah

Overholtzer, Lisa (McGill University) and John K. Millhauser (North Carolina State University)

[128] *A Tale of Two Pueblos: Varying Consumption Practices and Market Dependence within the Margins of the Spanish Colonial Empire in Mexico*

Studies of Spanish colonial capitalism often exclude Mesoamerica or relegate it to a peripheral and dependent role in the emerging global economy. Despite prehispanic antecedents for many capitalist practices, such as market-based circulation and market dependence, the economy that emerged in New Spain is often portrayed as a function of the European economy. In contrast, we follow Pezzarossi in considering how colonial shifts in consumption were informed by prehispanic practices and were not strictly the result of top-down forces emanating from the capital. Furthermore, we answer the call of postcolonial theory to decenter and resist flattening Indigenous experiences of capitalism and colonialism by tracing the paths of two neighboring Indigenous communities—Xaltocan and San Bartolomé Salinas—located outside the metropole. Although both participated in the same market networks, their paths diverged by the early seventeenth century congregaciones, and Xaltocan survives today while San Bartolomé Salinas lies vacant. Materials as diverse as pottery, cutlery, and animal bones tell disparate tales of each community's colonial economic encounter. They also allow us to begin to consider intraregional variation in shifting market engagement across the prehispanic to early Colonial transition, and their possible implications for the varying endurance of these places.

[322] *Discussant*

[209] *Chair*

Overholtzer, Lisa [209] see Millhauser, John K.

Owens, Andrew (Utah State University), David Byers (Utah State University) and Molly Boeka-Cannon (Utah State University)

[181] *Aging Mandibular Bison Teeth with ArcGIS*

This talk presents a new, nondestructive, empirical, and replicable method for aging bison teeth with mandibular tooth photos and ArcGIS digital mapping. Tooth eruption, growth, and attrition can document age-at-death, which informs on hunting strategies, occupation seasonality, environmental conditions, and herd health. Previous dentition studies utilize numerous tooth metrics that commonly require specimen-destructive research methods. Also, occlusal wear age estimates rely on subjective wear patterning classifications and figures. We suggest a new approach that provides age profiles by "mapping" occlusal wear with ESRI's ArcGIS® software. Planview mandibular tooth photos from the University of Wyoming's known-age mandible sample, and well-documented prehistoric samples including the Agate Basin, Hawken, Horner, Glenrock, and Vore sites were captured and georeferenced. Next, GIS polygons were digitized for various occlusal surface features. Digitized GIS shape files were then used to generate various occlusal surface feature areas, and multiple statistical methods were employed that explore relationships between quantified occlusal surfaces and specimen ages. Lastly, traditional mandibular tooth figures are presented which demonstrate the extreme occlusal wear detail produced by this tooth mapping method.

Owlett, Tricia (Stanford University)

[99] *Finding Greener Pastures: The Local Development of Agro-Pastoralism in the Ordos Region, North China*

This paper integrated new archaeobotanical and zooarchaeological research in the Ordos region to provide new information on the timing, mechanisms, and process of development of agropastoralism in China. The paper includes a new synthesis of archaeobotanical and zooarchaeological data to understand the nature and the beginnings of agropastoralism as early as the Late Neolithic period (2600–1900 BC). Environmental factors constrained and shaped animal husbandry in the Ordos Region, an area that exhibits a broad range of environmental conditions. However, this data also points to flexibility and diversity in how agropastoralism was originally adopted in this region.

[99] *Chair*

Oyanedel Perez, Juanita [231] see Swift, Jaime

Ozawa, Koji

[36] *Transnational Considerations at Japanese American Incarceration Camps*

In 1942, all people of Japanese descent living along the western coast of the United States were forcibly removed from their homes and imprisoned in 10 incarceration camps. Decades after the incarceration a congressional commission found that racism, wartime hysteria, and a lack of leadership led to this unjust imprisonment. The scholarship surrounding the archaeology of the incarceration centers has grown over the past 20 years, with several ongoing studies conducted by universities and the National Park Service. At the same time research at sites associated with Asian Americans has called for more nuanced interpretations of these diverse populations. Recent exploratory work focusing on gardens at the Gila River Incarceration Camp has highlighted the need for a transnational framework when approaching the material culture of these sites of confinement. Only by considering the global connections of the incarcerated population can a greater understanding of the complex mélange of identities be reached.

Ozbun, Terry (AINW) and John Fagan (AINW)

[100] *Artifacts Talk Back: Technological Analysis of Flakes and Flake Scars*

Reading the ancient language of lithic reduction technologies from archaeological assemblages of flakes and flaked-stone tools requires practical knowledge of key physical attributes and their interrelationships. Lithic literacy begins with understanding the basic anatomy of flakes and flake scars formed according to the laws of fracture mechanics. Variability in the expression of this basic anatomy directly reflects characteristics of the lithic material, mechanical actions applied, and technological choices of the person manipulating the stone. Direct analogy through experimental flintknapping and stone tool use provides a basis for understanding the range of technological choices available at each step of often complex processes and the results of the application of these choices relative to key attributes. Practiced flintknappers learn to recognize the distinctive characteristics of different technological systems, including failures and successes, indelibly written into the attributes of flakes and flake scars. While metric approaches cloak lithic analyses in scientific garb, they generally fail to provide meaningful results. Instead, reading the attributes and understanding their structure or grammar is more powerful for comprehending the technological and cultural meaning of lithic artifacts. We propose a framework for combining analyses of flake attributes, types, and assemblages for comprehending the cultural meanings of lithic technologies.

Ozorio de Almeida, Fernando (Universidade Federal de Sergipe)

[327] *When Traditions Are Manufactured, Used, and Broken: Examples from Tupian Contexts in Amazonia*

One of the most insightful contributions recently put forward by anthropology and ethnoarchaeology is related to the concept of the “communities of practice.” It is naturally connected to issues such as the relation between language and material culture, transmission, identity, persistence, structure as well as the limits of socially permitted restructuring of practices, and even the possible contingencies which might cause deep change and break the structure and, therefore, Tradition. The objective of this paper is to address these issues within Tupi speaking contexts (i.e., the Tupi-Guarani and other families of this language stock), from the Madeira and Tocantins Rivers, southern Amazonia. The vectors of this discussion are the Polychrome and Tupi-Guarani Traditions, both persistent and geographically broad styles on the precolonial Tropical Forest.

Paap, Iken (Instituto Ibero-Americano Berlin)

[67] *Discussant*

Pace, Anthony [133] see Malone, Caroline

Pacheco-Cobos, Luis [162] see Winterhalder, Bruce

Pacheco-Fores, Sofia (Arizona State University), Christopher Morehart (Arizona State University), Elise Alonzi (Arizona State University), Gwyneth Gordon (Arizona State University) and Kelly Knudson (Arizona State University)

[8] *Expanding Radiogenic Strontium Baseline Data for Central Mexican Paleomobility Studies*

Radiogenic strontium ($^{87}\text{Sr}/^{86}\text{Sr}$) isotope values reflect local geology and have long been used in analyses of paleomobility within Mesoamerica. Research has focused on reconstructing individuals' residential histories by comparing strontium isotope ratios in individuals' tooth enamel and bone with local baseline values generated from soils, plants, or local fauna. While a great deal of work has been done developing baseline values across the Maya region, work in central Mexico is predominantly focused on the Classic period urban center of Teotihuacán. This study will contribute to paleomobility research in central Mexico by analyzing a combination of modern soil ($n = 32$), plant ($n = 25$), and faunal ($n = 8$) samples to generate an expected “local” range of bioavailable strontium ratios for the Epiclassic (600–900 CE) shrine site Non-Grid 4 in Lake Xaltocan in the northern Basin of Mexico. The shrine was established following the collapse of Teotihuacán, and is associated with a large deposit of human crania showing evidence of decapitation. Characterization of local signatures of strontium isotope values from the shrine indicates whether different sites within the Basin of Mexico can be distinguished isotopically. Additionally, this study serves as the first step in determining whether these sacrificed individuals were of local or nonlocal origin.

Padilla, Liliana [125] see Baron, Joanne

Padula, Katherine

[364] *Re-Placing the Plantation Landscape at Yulee's Margarita Plantation, Homosassa, Florida*

Yulee Sugar Mill Ruins Historic State Park (C1124B) contains the remnants of a nineteenth-century sugar mill, associated with Margarita plantation located in Homosassa, Florida. At present, documentation of the plantation boundaries is limited and locations of various associated buildings, including slave quarters, are unknown. To address this issue, a reconnaissance survey is underway in the vicinity of the mill to identify associated plantation structures and boundaries. Preliminary results indicate that remains of the plantation are not in the immediate vicinity of the sugar mill, warranting further survey.

Padure, Adrian (University of Bucharest)

[139] *The Dead in a Transylvanian Village*

The present paper is part of a doctoral research project. The project develops and reworks a 1930s sociological exploration, conducted as part of the Sociological School of Bucharest. In this paper I will make a broader framing, at a Romanian macro-level, of the funerary practices conducted within the village of Clopotiva, Transylvania. I intend to use both data from the 1930s research, as well as a new exploratory input gained during my fieldwork, which began in 2012. I will tackle handling of the dead body, from the very first interaction, washing with water, until the last, undertaken as part of a secondary burial ritual, within a few years after burial, namely bone cleansing with wine. Between these two acts, I will address the many contexts in which the living interact with the dead, including stabbing the dead before the burial, and body or heart burning, after burial (a practice adopted to appease the undead). In the case of body burning, usually an exhumation is required, because the burning needs to be done far from the village. The evidence for postmortem interaction with the body will also be considered in the context of individual identity, by evaluating different types of burial provided according to age and marital status.

Pagano, Victoria (Texas State University and ASWT Project)

[126] *The Developing Tale of Sayles Adobe*

The Sayles Adobe terrace site (41VV2239) rests within Eagle Nest Canyon 300 m upstream from the Rio Grande confluence. The site name comes from E. B. Sayles's 1932 sketch map of the canyon which notes an area of “sandy adobe” below Skiles Shelter. ASWT research began at Sayles Adobe this past spring with excavations focused on investigating natural terrace formation and cultural deposits buried within. Using a combination of old and new archaeological techniques, Sayles was quickly found to be a deeply stratified, multicomponent site, sharing similarities with other Lower Pecos terrace such as Arenosa Shelter and Devils Mouth. Numerous compacted-silt flood drapes frame the cultural deposits across the site, demonstrating stratigraphic integrity and in a few cases preserving a unique context for artifacts. A geoarchaeological analysis of the site will be the main focus, based on various sediment analyses—i.e., physical, chemical, magnetic susceptibility, etc. Radiocarbon dating of the cultural zones will lend a hand in the development of the cultural chronology and its relationship to the many sites within ENC. This presentation details the ongoing Sayles Adobe work as part of my master's thesis research, and presents preliminary interpretations of the natural stratigraphic sequence and observable cultural patterns.

Pai, Mahealani [43] see Rossen, Jack

Paige, Jonathan [89] see Chase, Adrian

Pailes, Matthew (University of Oklahoma)**[84]** *Comparing and Contrasting Community Structure across the Northwest/Southwest*

One of the most enduring contributions made by Suzy and Paul Fish was their elucidation of the role played by multi-settlement communities in structuring sociopolitical organization. The community concept, initially elaborated in the Hohokam region, now fulfills a central interpretive role in many regions of Northwest Mexico. In this paper, I compare characteristics of communities across several regions of the Northwest/Southwest to demonstrate qualitatively different organizational precepts. Topographical and environmental parameters play a major role in directing community formation. Social factors, such as spatial juxtaposition to Mesoamerican influence, also substantially impact community character. These community level differences emerge as likely drivers of alternate demographic, political, and ideological trajectories when considered from a pan-regional scale perspective.

Painter, Jeffrey (Michigan State University) and Jodie O'Gorman (Michigan State University)**[102]** *Foodway Variability in the Oneota Tradition: A Pilot Study of Cooking Pots*

As a tradition, Oneota encompasses a wide geographic area and several groups, each with their own unique developmental histories. It also encapsulates multiple population movements and other complex social interactions that took place in various areas. Living in a dynamic social setting, different Oneota groups likely negotiated their social landscape in diverse ways. Foodways may have been one way that Oneota peoples either adapted to or set themselves apart from those with which they came in contact. Presented here are the results of a pilot study comparing samples of Oneota ceramic assemblages from the Bold Counselor Phase (AD 1275–1425) Morton Village site in central Illinois and the Brice Prairie (AD 1300–1400) component of the Tremaine site complex in the La Crosse Locality of Wisconsin. Morphological and functional data are used to explore whether cooking patterns and the way ceramics were constructed indicate a uniform pattern of Oneota cooking or a more flexible pattern of foodways.

Paiz Aragón, Lorena [125] see Munson, Jessica

Paja, László [196] see Williamson, Kylie

Palacios, Cristóbal [233] see San Román, Manuel J.

Paling, Jason (Plymouth State University), Hannah Dutton (Plymouth State University) and Justin Lowry (George Mason University)**[326]** *Ceramic Compositional Analysis from Chiquilistagua, Nicaragua*

This paper discusses patterns of production and distribution of pottery recovered from the site of Chiquilistagua through the use of X-ray Powder Diffraction (XRD) and Instrumental Neutron Activation Analysis (INAA) compositional data. Dominant types found in the Chiquilistagua assemblage include Usulatan, Espinoza, Segovia, Chavez Astorga, and Nejapa Roja. Occupational episodes at Chiquilistagua extend across the Tempisque and Bagaces ceramic spheres, which have been associated with widespread social and political reorganization. These shifts are reflected in changes in ceramic style and regional distributional patterns. Ceramic samples tested were compared to existing compositional databases and the results of this study continue to illuminate patterns of ceramic production and distribution near Lake Managua.

Paling, Jason [326] see Sternberg, Evan

Palit, Linda [386] see Cobb, Allan

Palka, Joel (University of Illinois-Chicago)**[157]** *Mesopotamian Clay Tokens, Pilgrimage, and Interaction*

This study explores the possibility that some Mesopotamian clay tokens were pilgrim's tokens, which signified interaction with spiritual powers or transactions with a shrine's religious specialists or administrators. Pilgrim's tokens around the world have often been made of earth and clay, some as effigies of goods desired or symbols of shrines and their spiritual forces, that are carried in bags, miniature ceramic vessels, or bullae. Previous investigations indicate that earthen artifacts have been made for pilgrim's badges, offerings to deities, pilgrim's blessings, and items exchanged between pilgrims, priests, or family members. These objects represent interaction between people and divine forces, and they show that a sacred journey was made to people back home. Tokens also represent economic transactions between pilgrims and vendors. Additionally, earthen tokens have been deposited at shrines as gifts, taken back to natal communities, or ingested to integrate spiritual forces in the body. In this presentation, I examine clay tokens from Mesopotamia, their archaeological provenience, and the social contexts of their production, exchange, and use to ascertain how they may have been utilized by pilgrims and ritual specialists.

Palma Malaga, Martha (Pontificia Universidad Católica del Perú) and Krzysztof Makowski (Pontificia Universidad Católica del Perú)**[276]** *The Challenges of Bioarchaeological Research in Peru: Archaeological Field-School Project "Pachacamac Valley" (1991–)*

The archaeological study of human burials presents many special challenges. Deterioration begins or accelerates with the exposure to new environmental conditions after recovery. In many cases, the context has to be analyzed in situ by bioanthropologists to record information before the removal of the materials to the laboratory and storage area. Continuous participation of bioarchaeologists is also vital for subsequent analysis of the funerary context many months or years after the end of the excavations. The Archaeological Project "Valle de Pachacamac" has developed long term research of three main archaeological sites located in the Lurin Valley: Tablada de Lurín (1991–2002), Pueblo Viejo-Pucará (1998–2012), and Pachacamac (2005–present). The project curates relatively sizable collections of human skeletal remains from Tablada de Lurín (~790) and Pueblo Viejo-Pucará (~850). The first bioarchaeological field school was started in Tablada de Lurín and has been ongoing since 1991. The three sites have diverse taphonomic features due to the seasonal environment and various methodological issues due to their different funerary traditions. In this paper we discuss the different challenges that the project has faced in order to preserve the materials and records of excavations and analysis in association with technological changes over the last 25 years.

Palmer, Carol [274] see Jenkins, Emma

Pan, Yan (Department of Cultural Heritage and Museology, Fudan University) and Baorong Lu (School of Life Science, Fudan University)**[78]** *An Investigation of Genetic Differentiation in Early Domestication of Oryza Sativa Based on InDel Molecular Marker Method*

The origin of *Oryza sativa* and its genetic differentiation during domestication is a long-lasting problem attracting wide attention of agronomists, archaeologists and geneticists etc. An array of hypotheses have been raised to interpret how wild rice evolved into today's domestic varieties. However, most studies of rice genetic diversity based on modern samples represent a biased sampling of germplasm from a restricted time period in rice evolution, so that important germplasm for understanding rice evolution has been largely lost. To make up this ignored field of the issue, investigation of archaeological materials is needed. Tianluoshan, a 7,000-year-old site in the lower Yangzi, provided well-preserved water-logged rice remains, allowing a direct study of ancient rice. We employed an accurate and efficient technology of identification of japonica and indica rice, InDel molecular marking method, to analyze the rice husks uncovered from Tianluoshan. The result shows the rice at Tianluoshan site could be a neutral type, not japonica- or indica-prone. This further implies that japonica-indica differentiation of *Oryza sativa* could not appear 7,000 years ago in the lower Yangzi although rice was being domesticated by human there.

Pan, Zezhen [72] see Lin, Yi-Ling

Panagopoulou, Eleni [169] see Starkovich, Britt

Panarello, Héctor [238] see Samec, Celeste

Panich, Lee (Santa Clara University)

[265] *Reconsidering the Connections between Ecological Change and Political Change in Colonial California*

California is geographically separated from the rest of North America by high mountain ranges and extensive deserts, but paradoxically the region's Mediterranean climate may have facilitated the imposition of Euroamerican colonial rule in the late eighteenth century. In particular, many scholars suggest that ecological changes accelerated political changes in the missionized portion of California's coastal strip. There, the rapid spread of invasive plant and animal species had far-reaching effects on regional ecosystems, which in turn undermined local indigenous subsistence economies. These changes are largely thought to signal the collapse of Native Californian polities and to partly explain the decision of indigenous people to join the socially restrictive Spanish mission system. Here, I reassess this long-standing interpretation in light of new faunal and botanical data from colonial-era sites as well as emerging approaches to understanding indigenous political and cultural autonomy under colonialism. While there is no doubt that the arrival of Euroamericans on the western coast of North America ushered in dramatic transformations to local ecosystems and indigenous polities, these new data indicate both temporal and spatial variation in the connections between ecological and political change in colonial California.

Pankanti, Sharathchandra [118] see Pezzutti, Florencia

Pantel, Agamemnon, Mark Noah (History Flight), Kristen Baker (History Flight), Chester Walker (History Flight) and Jay Silverstein (DPAA)

[41] *Archaeological Research in the Recovery of World War II MIA's on a Pacific Atoll: Tarawa*

Archaeological research on 538 MIA's from World War II has been ongoing on the Pacific atoll of Tarawa over the past two years under the auspices of History Flight, an NGO. Tarawa, one of the bloodiest World War II battles in the Pacific, still has hundreds of MIA's unaccounted for in one of the most densely populated locations on earth. History Flight, with the collaboration of professionals, para-professionals, military volunteers, DOD and the local community have been successful in locating and recovering over 110 individuals. The team has used a transdisciplinary approach to the research, starting with extensive historical documentation, followed up by extensive archaeological remote sensing, and the use of a cadaver dog. Corroboration of GPR data with cadaver dog alerts and historical information has allowed History Flight to recover over 13,000 human osteological remains, often in direct association and in situ with military artifacts assisting in the field identification of U.S. soldiers versus Japanese. The field detection and archaeological excavation of these "burial" sites has been significantly impeded by the direct impacts to the sites immediately following the cessation of the war, together with impacts of today's dense population. Procedures and results of this public/private partnership work will be presented.

Pantoja, Luis and Maria Jose Gómez

[183] *La muerte entre los Mayas: Variabilidad de las prácticas funerarias en los sitios arqueológicos de la región de Ichkaantijoo*

La muerte es un proceso natural a la cual el ser humano le ha otorgado unas cargas culturales tan variables como los grupos sociales mismos: la forma en que será tratada dependerá de aspectos políticos, ideológicos, sociales y simbólicos. Por ende, la variabilidad del tratamiento mortuario es un reflejo de categorías relacionadas con jerarquía interna que puede estar relacionada con características bioculturales. Durante la investigación del Proyecto Arqueológico Región de Mérida (PARME), en varios sitios de la antigua Ichkaantijoo, se exploraron en grupos habitacionales enterramientos con diferentes características en continente y contenido. Por tanto, nos preguntamos si ¿Existe una variedad en las prácticas funerarias en Ichkaantijoo? de ser así ¿En qué se distinguen? y finalmente ¿Cuáles son los factores que hacen que ésta varíe? A través de la investigación bioarqueológica se analizaron los contextos mortuarios y se identificaron diversos aspectos en los tratamientos de los difuntos que sugirió una interacción social en el norte de Yucatán, México.

Papadopoulos, Nikos [29] see Parkinson, William

Parcero-Oubiña, César [324] see Criado-Boado, Felipe

Parditka, Györgyi (University of Michigan, Museum of Anthropological Archaeology)

[261] *Winds of Change: Funerary Practices at the Dawn of Late Bronze Age in Southeast Hungary*

The transition from Middle to Late Bronze Age in the Carpathian Basin encompassed a broad range of changes in material culture, settlement, and societal organization. This transition is traditionally seen as a short, war-ridden horizon reflecting the arrival of the Tumulus culture population. Recent research, however, emphasizes the complexity of these transformations, and suggests a longer, less abrupt transition, in which existing Middle Bronze Age populations play a significant role in the formation of Late Bronze Age societies. The study of funerary practices from this period can provide important insight into these changes. Excavations in the early 1960s at Tápé-Széntégláégető unearthed over 600 Bronze Age burials, thought to be associated with the Tumulus culture. The location of the cemetery at the edge of the preceding Early-Middle Bronze Age Maros culture territory and similarities in funerary custom, however, raises questions about the possible relationship between the Tápé population and the Maros group. The analysis of funerary practices at Tápé highlights both continuities with Middle Bronze Age practices, and the distinctiveness of the new Late Bronze Age

social formation. These results contribute to a more general understanding of the newly crystalizing Late Bronze Age societies within the Carpathian Basin.

[196] Chair

Parditka, Györgyi [196] see Barlow, Robert

Pardo Gordó, Salvador [38] see Bergin, Sean

Paredes Gudino, Blanca (INAH)

[328] *Relevance to the Registry of Archaeological Sites for Their Protection: Proyect: Milpa Alta's Cultural Landscape*

In the search for alternative ways for the protection of archaeological heritage, especially in Mexico, which has a vast heritage wealth; there is now an urgent need to raise specific protective tangibles in the immediate short term due to different factors that are contributing to their total loss, or the gradual deterioration of the archaeological wealth of our country. The main causes for this: population growth, limited budget, and archaeological looting, as well as many other factors. In this case, it has important relevance to create a good record of all archaeological sites as the basis for the whole research, but also for its future protection. We should emphasis that according to the national regulatory framework that regulates us (a Federal Law for Artistic and Historical monuments and Archaeological Areas), the registry is a tool that allows for legal recognition and essentially the existence of a site in its complexity and temporality. As mentioned, I'm presenting in this paper, the work of archaeological survey that has taken to place in the Cultural Landscape Project in Milpa Alta. As a result, this survey is now marking the importance of good record keeping of these sites, allowing for more comprehensive studies.

Pargeter, Justin (Stony Brook University) and Metin Eren (Kent State University)

[40] *Bipolar Reduction and Lithic Miniaturization: Experimental Results and Archaeological Implications*

Lithic miniaturization, the systematic production and use of small tools from small cores, was a consequential development in Pleistocene lithic technology. Bipolar reduction is an important but often overlooked and misidentified strategy for lithic miniaturization. This experiment addresses the role of axial bipolar reduction in processes of lithic miniaturization. The experiments answer two questions: what benefits does axial bipolar reduction provide, and can we distinguish axial bipolar reduction from freehand reduction? Our experiments demonstrate the numerous advantages of bipolar reduction in contexts of lithic miniaturization. Bipolar reduction produces more cutting edge per gram and is more economical than freehand reduction. Our cutting edge to mass values exceed even those obtained with pressure blade production on high-quality obsidian. The experimental results show that bipolar reduction produces cutting edge quicker and is more efficient than freehand reduction. We show that bipolar reduction can be distinguished from freehand reduction with a high degree of confidence using the quantitative criteria in these experiments. These observations overturn long-held perceptions about bipolar reduction. We conclude by discussing the role of bipolar reduction in lithic miniaturization and Stone Age economics more broadly.

Paris, Elizabeth H. (University of Calgary)

[135] *Metallurgical Production at Mayapán, Yucatán, Mexico: New Discoveries from the R-183 Group*

The Postclassic period urban center of Mayapán housed numerous household craft production industries, including metallurgical production. The recovery of metal artifacts, production debris, and metallurgical ceramics from contexts throughout the city suggests a number of independent production sites. One of the most significant archaeological contexts associated with metallurgical production is the R-183 group, an elite residential group in the southeast mid-city sector. Salvage excavations in 1998 recovered a small cache in Structure R-183b containing 282 copper bells, two miniature ceramic vessels filled with metal, and production debris including loose casting sprues and failed bells. The structure also contained a tomb that included a copper bell and evidence of apiculture likely associated with lost-wax casting. Further excavations at neighboring structures in 2015 revealed additional metal consumer goods and metallurgical ceramic mold fragments. Metallographic analysis of a small copper bell and wire fragments from the R-183b cache using SEM-EDS reveal lost-wax casting production techniques using technologies also suggested by metallurgical ceramic mold fragments found at the group. The results of portable X-ray fluorescence spectrometry of metal artifacts and metallurgical ceramics from the R-183 group provide insight into the range of copper alloys and technological decisions made by its artisans.

[135] Chair

Paris, Elizabeth H. [164] see Tarkanian, Michael

Parise, Martina [389] see Riel-Salvatore, Julien

Parish, Ryan (University of Memphis), Bretton Giles (Center for Environmental Management of Military La) and Kenneth Rowland

[89] *Investigating Hopewell Interaction at the Crib Mound Site through Source Analysis of Chert Cache Bifaces*

The prehistoric cultures of the Middle Woodland Period (200 BC–AD 350) have been a central research focus in North American archaeology since the eighteenth century. One trademark of these culture groups, commonly referred to as "Hopewell," is the presence of extensive social networks as evidenced by large amounts of exotic materials acquired from great distances. Chert cache discs found in the thousands in burial contexts are reported to have moved along these social networks. Both Wyandotte (Ste. Genevieve) chert from Indiana and Cobden (Upper St. Louis) chert from Illinois are commonly cited sources for Hopewell cache discs. However, few analytical source studies examine the source of chert to verify the purported long distance movement of the raw material. The study analyzes a sample of Hopewell cache discs found at the Crib Mound Site, Indiana. Hundreds of chert discs were excavated by artifact collectors but can still inform us about exchange relationships with contemporaneous groups from the Illinois Valley or a reliance on more localized deposits.

Park, Geuntae (Jeju Archaeology Institute)

[24] *Neolithic Development on Jeju Island: Adaptation in a Broad Northeast Asian Perspective*

Jeju Island, locating southwest from the mainland of Korea, documents the earliest Neolithic culture in Korea. The Neolithic period in Jeju can be divided into six phases (Incipient, Initial, Early, Middle, Late, Final). The Gosan-ri type pottery of the Incipient phase has been only identified in Jeju. From the Initial to Final phases, the applique, Youngseon-dong type, Bonggye-ri type, and double-rimmed types of pottery have been found in Jeju, parallel to the Neolithic development along the southern coastal region of Korea. Only the Tasseon chimseonmun, thick, slant line-patterned pottery type of the Middle Neolithic phase, has not been found in Jeju. This study examines Neolithic focuses on the Gosan-ri culture of the Incipient phase, an Early Holocene

adaptation to island environments. The Gosan-ri culture shows the Upper Paleolithic lithic technology and Gosan-ri type pottery. One of the critical research issues on the Neolithic Jeju is the why the Incipient Neolithic culture has not been found in mainland Korea and whether this Gosanri type pottery of the Incipient phase can be understood within the Northeast Asian early pottery tradition, including China, Far Eastern Russian Primorye maritime region (Primorsky Krai), and Japan.

Park, Robert [22] see ten Bruggencate, Rachel

Parker, Ashley, Christopher Parker (University of Utah) and Brian Coddig (University of Utah)

[383] *When to Defend? Optimal Territoriality across the Numic Homeland*

Research exploring the complex human decisions that lead to territoriality have largely focused on defensibility. Here we explore territoriality using an ecological and evolutionary model from behavioral ecology: the marginal value theorem (MVT). Based on the principal of diminishing returns, the MVT predicts that the utility of a plot of land will decrease with each additional plot, therefore people should defend an area only at a threshold when it becomes energetically beneficial within the local socioecological context. Based on variation in environmental productivity and population density, we suggest these decisions will create an optimal territory size that should be smaller in high productivity areas with denser populations, and larger in low productivity, low population areas, with the former allowing greater opportunities and payoffs for defense. Numic foragers of the Great Basin and surrounding areas provide an illustrative case study to validate the basic ecological model of economic defensibility, and assess predictions about when hunter-gathers will likely start defending resources. In this paper we explore how environmental productivity, population density, and home range size all play a critical role in determining when a population should defend their territory.

Parker, Ashley [193] see Haisley, Christopher

Parker, Christopher (University of Utah), Nicole Herzog (University of Utah), Earl Keefe (University of Utah), James O'Connell (University of Utah) and Kristen Hawkes (University of Utah)

[282] *The Archaeological Consequences of Human Fire Use: Analyses, Interpretations, and Implications for Understanding the Evolution of Pyrotechnic Behaviors*

The importance of controlled fire use in human evolutionary history is widely acknowledged, but the timing of initial anthropogenic fire use and control remains contentious. This debate has recently extended to question whether fire-making behavior was maintained and employed by early hominins moving into northern latitudes based on inconsistencies in archaeological fire signatures in the European record. A series of recent publications interpret these inconsistencies as indicating that populations moving out of Africa into colder climes during the Pleistocene did not maintain pyrotechnic behavior, but rather used fire opportunistically. For these analysts, earlier archaeological evidence of anthropogenic fire use does not imply a sustained pattern of fire using behavior. Here, we review the archaeological evidence from European Paleolithic sites interpreted as reflecting opportunistic fire use in light of archaeological and ethnographic evidence of human fire-making and maintenance, and suggest that the inconsistencies in archaeological fire records do not indicate lack of ability to create and maintain fire on the part of early Homo. We argue that the benefits provided by fire control and use are substantial and pervasive enough they would not be abandoned once adopted.

Parker, Daniel

[342] *Assessing the Strength of Prehistoric Glues*

Glues and adhesives have been used since ~200,000 years ago. A significant question about glues and adhesives in prehistoric contexts is exactly what level of holding strength do various blends have. A widely used glue in prehistory is pine pitch; whose ingredients are pine sap, ash, and a binder, such as dried grass. An experiment is presented here to determine how strong variations in concentrations of these ingredients affect holding strength. Six different variations of the glue were used, with modern wood glue as a control. Each glue was tested ten times to measure holding strength by applying the glue to two oak wood blocks and then applying steady force until failure. After all the testing was complete the data was analyzed to see how each sample compared to the control and which concentration of ingredients worked best.

Parker, Evan (Tulane University), George J. Bey (Millsaps College), Tomás Gallareta Negrón (INAH Centro Yucatán) and Betsy Kohut (Millsaps College)

[298] *Excavation of a Rural Middle Preclassic Maya Village: Investigations at Paso del Macho, Yucatán, Mexico*

Paso del Macho is a Middle Preclassic village settlement located in the eastern Puuc region of the Yucatán Peninsula. Excavations of mounded architecture, the main plaza, and ball court of the site have established a chronological range beginning in the early Middle Preclassic and ending by the Late Preclassic. The earliest architecture at the settlement includes at least three small raised platforms associated with Ek ceramics, the earliest pottery complex in Northern Yucatán. Following this, the site underwent a major planned renovation, culminating in the construction of eight earth and rubble platform mounds, including a ball court. The expansion of the settlement coincided with the introduction of exotic trade items such as jade, basalt, and marine shell in addition to the appearance of the Early Nabanche complex of pottery. The manner of the founding and later expansion of Paso del Macho indicates that the introduction of ball courts at rural Middle Preclassic settlements may be associated with the concomitant rise of major monumental settlements such as Xocnaceh, Yaxhom, Komchen, and Xtobo. Furthermore, the presence of exotic prestige items at a small rural village settlement suggests that the Maya ballgame developed in conjunction with the institution of sociopolitical inequality in the region.

[298] *Chair*

Parker Pearson, Mike (UCL Institute of Archaeology)

[20] *Stonehenge: A Late Neolithic Megasite*

Stonehenge is part of a larger complex of Late Neolithic (3000–2450 BC) sites and monuments on Salisbury Plain, including a major settlement complex with monumental timber circles at Durrington Walls. Evidence for occupation from this period covers over 8 square miles. In particular, the Durrington Walls settlement covered 42 acres, built in the same period as Stonehenge's main stage of construction. This settlement was occupied only for decades, or even just a few years, by people with a primarily pastoral subsistence base who brought their livestock from many different parts of Britain, as revealed by isotopic analysis. Faunal evidence indicates seasonal winter feasting at Durrington Walls, suggesting a degree of annual movement to and from this settlement, perhaps inhabited by the builders of Stonehenge. Despite having many of the characteristics of an urban complex, Stonehenge cannot be considered so. Yet it was very much a "consumer" megasite, drawing people, resources and monumental materials (both of stone and timber) from, in some instances, many hundreds of miles away. Just what was considered to be exchanged in the other direction is a major topic of archaeological debate.

Parker Pearson, Mike [216] see Edinborough, Kevan

Parkinson, William (Field Museum of Natural History), Apostolos Sarris (IMS-FORTH), Rebecca Seifried (University of Chicago), Nikos Papadopoulos (IMS-FORTH) and Cristina Manzetti (IMS-FORTH)

[29] *Integrating Satellite Imagery and Ground-Based Remote Sensing to Reconstruct a Neolithic Village*

As part of a long-term project aimed at modeling the emergence of large, nucleated, Neolithic villages in the Carpathian Basin, the Körös Regional Archaeological Project (KRAP) collaborated with the Institute of Mediterranean Studies at the Foundation for Research and Technology, Hellas (IMS-FORTH), to integrate multi-spectral satellite imagery and ground-based remote sensing techniques to reconstruct the spatial organization of the Szeghalom-Kovácsfalom settlement, which covered more than 100 ha. The layering of datasets from 1) satellite images, 2) ground-based geophysical surveys including magnetometry, ground-penetrating radar, electromagnetic and electrical resistance tomography, as well as 3) AMS dates from targeted excavations permitted the team to develop a 3D virtual reconstruction of the layout and evolution of the prehistoric village. Geophysical results also allowed a GIS spatial analysis of the structural elements of the site in relationship to local geomorphological features. The synthesis of both excavation and remote sensing results contributed to the virtual reconstruction of the village (https://www.youtube.com/watch?v=J_eRN20PPuM).

Parkinson, William [178] see Yerkes, Richard

Parrish, Chris (U.S. Army Corps of Engineers, Albuquerque District)

[351] *Ho! To the Land of Sunshine: Mitigation and Public Outreach for the BNSF Abó Canyon Double Track Project in Central New Mexico and the Ute Lake Subdivision Project in Northeastern New Mexico: Lawsuits, Artifacts, and an Archaeological Right-of-Entry Agreement*

The U.S. Army Corps of Engineers (Corps) Regulatory Program initially served a fairly simple, straightforward purpose: to protect and maintain the navigable capacity of the nation's waters. Time, changing public needs, evolving policy, case law, and new statutory mandates have changed the purview of the program, adding to its breadth, complexity, and authority. Prior to the issuance or authorization of any Department of the Army permit under Corps regulatory authorities (e.g., the Clean Water Act), the Corps must consider potential effects on historic properties in compliance with the National Historic Preservation Act and other applicable regulations. Per these regulations, the Corps requires that applicants mitigate for unavoidable adverse effects to historic properties from any work, structure or discharge within Corps jurisdiction that requires a DA permit. Increasingly, project stakeholders want collaborative mitigation with tangible products that address a broad spectrum of issues. Relative to this trend, this paper discusses two projects in New Mexico that resulted in creative forms of mitigation to resolve adverse effects to historic properties: the Abó Canyon Double Track Project and the Ute Lake Ranch Subdivision Project.

Parsley, Colleen (University of British Columbia)

[294] *The Mass Grave at Kulleet Bay: Bioarchaeological Evidence of Human Catastrophe*

A mass grave of cremated individuals representing 15,353 comingled bone fragments representing 65 individuals was uncovered from the ancient Northwest Coast archaeological site of DgRw-17, a continuously occupied Stz'uminus First Nation village in Kulleet Bay. Cremation of multiple individuals buried in a mass grave is not an established burial tradition or mortuary practice of any Coast Salish community. Mass graves of comingled and cremated human remains may represent ossuaries or episodic catastrophic events. Throughout time mass graves have had associations with disease outbreak, natural disaster, warfare, or genocide and invoke a transcendent icon of human catastrophe. A bioarchaeological study of the Kulleet Bay mass grave included the recording of all skeletal elements, pathologies, individual age, fragmentation and burn patterns to determine the MNI and whether any internal patterning of the placement of individuals in the grave was detectable. The results of the mortuary profile and radiocarbon dates of 2,400 cal BP situated within the archaeological context suggest a major catastrophe occurred in Kulleet Bay at the transition from Locarno to Marpole cultural sequences. This research was undertaken and funded by Stz'uminus First Nation and with funding contributions by a University of British Columbia Hampton Research Grant F15-01298

Patania, Ilaria (Department of Archaeology, Boston University), Susan M. Mentzer (Institute for Archaeological Sciences, University), Ofer Bar-Yosef (Department of Anthropology, Harvard University) and Paul Goldberg (Department of Archaeology, Boston University)

[213] *Micromorphology of Hearth Features and FTIR Analysis of Clays at Xianrendong and Yuchanyan Cave: Reconstructing Pyrotechnology and Human Behavior Connected with the Earliest Pottery*

The cave sites of Xianrendong and Yuchanyan are known for having produced the earliest pottery sherds yet discovered, respectively 20,000 cal BP and 18,600 cal BP. Both of these Chinese Upper Paleolithic sites have been systematically sampled for radiocarbon dating and geoarchaeological analysis. Through micromorphology we identified clay lined fire features and ash lenses at both caves, revealing technological behavior concerning pyrotechnology and the manipulation of clays in the Chinese Upper Paleolithic. Here we discuss pyrotechnology at the sites and reflect upon use and firing techniques of the earliest pottery. Low heating temperatures are confirmed at both sites through the FTIR analysis of clays and the micromorphological analysis of the ashes. For Xianrendong, FTIR analysis of sedimentary clays shows consistent firing temperatures not exceeding 400°C, suggesting the absence of kilns at the site. Our study at Yuchanyan supports the possible use of pottery on low heat open fires. This is the first step to more comprehensive investigations of production techniques, cooking practices, and human behavior related the earliest pottery. Our study also demonstrates the advantages of the systematic use of geoarchaeological methods in the study of the Chinese Upper Paleolithic.

Patania, Ilaria [234] see Perez-Juez, Amalia

Patel, Shankari [318] see Blackmore, Chelsea

Pathy-Barker, Caroline (Sainsbury Institute)

[122] *ORJACH: Teaching Japanese Archaeology and Culture Online*

New technologies must be utilised and our new online resource is a "great tool" and invaluable for teachers and students. The aim of the online project is to increase awareness to the rich Japanese cultural Heritage and archaeology. ORJACH is providing fantastic educational resources and "fun" materials for teachers in the form of lesson plans, worksheets and a hands on finds box for use in primary and secondary schools via an online interactive gateway. I will be demonstrating the successful exciting lessons tried out in schools with hands-on supporting material. Key words: Archaeology and heritage, teaching, outreach, Japanese online resource, interactive, stimulating, worksheets, Primary, Secondary schools.

Patiño-Contreras, Alejandro [125] see Sion, Julien

Patroni, Karla [233] see Perea, Ema

Patton, Katherine (University of Toronto) and Trevor Orchard (University of Toronto Mississauga)

[176] *The Use and Cultural Importance of Eulachon (Thaleichthys pacificus) on the NWC: An Example from Prince Rupert Harbour*
Eulachon was an important resource for many NWC First Nations. Ethnographers such as Garfield and Boas note the particular importance of this fish among the Tsimshian. One of the primary eulachon spawning locations on the coast is at the mouth of the Nass River, north of PRH, and rights to fish at particular locations in this area were owned by Tsimshian descent groups. Access to this fish, its processing, and storage played an important role in structuring subsistence and settlement patterns, as well as social and political relations among the Tsimshian and neighboring groups. Oral records document that fishing eulachon is an ancient Tsimshian practice, yet archaeological data from sites in PRH have produced relatively low rates of eulachon remains, even when fine screens are used. We aim to address two points with this paper. First, we explore what biases might affect the recovery and interpretation of eulachon remains in archaeological contexts in comparison to expectations drawn from written and oral historical sources. Second, we examine multiple lines of data to consider how the Tsimshian, and other NWC groups, used eulachon in the past and how it might have influenced broader aspects of ancient Tsimshian lifeways.

Patton, Katherine [319] see Hrynick, Gabriel

Patton, Margaret [344] see Dowkes, Shalcey

Pauketat, Timothy R. (University of Illinois)

[393] *Bundled Transfers and Water Shrines: The Big-Historical Implications of a Pan-American Phenomenon*

Even a cursory outline of the pan-continental history of nondomestic circular architecture impels us to relate similar buildings, some of which are water shrines, in the greater Cahokia region to Mesoamerica and the Southwest. In the central Mississippi valley, standardized steam baths, rotundas, and circular platforms make a dramatic appearance in the late eleventh century CE. Explaining the big-historical patterns, of which this appearance is a part, entails theorizing the bundled transfer of putative religious practices. Thus, this paper draws from both a contemporary relational archaeology and the anthropology of Michael Taussig and Mary Helms. The result involves rejecting yet-common functional categorizations of circular architecture while unpacking how the animacies of buildings are localized. Definitive conclusions are not yet possible, but the implications include rethinking pan-American "connections."

Pauketat, Timothy R. [20] see Wilson, Gregory

Paulette, Tate (Brown University)

[297] *Grain, Storage, and State Making in Mesopotamia (3200–2000 BC)*

The states that emerged in Mesopotamia during the fourth and third millennia BC were fundamentally agrarian states. They were built on the production, stockpiling, and redistribution of grain, and they invested an enormous amount of energy in managing and monitoring the grain supply. In this paper, I draw particular attention to grain storage and its pivotal role in the rhetoric and the logistics of state making in Mesopotamia. Grain storage facilities were positioned, both physically and symbolically, at the very heart of the redistributive economy and at the very heart of the state apparatus. Grain storage, therefore, offers a unique vantage point from which to examine not only the nature of state power but also the process of state making. The earliest Mesopotamian states did not simply appear, fully formed and destined for total domination. They were made. These states were complex, often fragile, constructions, and their reach, that is, the actual extent of their authority, seldom matched the breadth of their ambitions. In this paper, I argue that a study of grain storage practices can help us to achieve a more accurate estimation of the shifting limits of state power and state-sponsored redistribution in Mesopotamia.

[297] *Chair*

Pavao-Zuckerman, Barnet [285] see Mathwich, Nicole

Pawlowicz, Leszek, Christopher Downum (Northern Arizona University) and Michael L. Terlep (Logan Simpson, Inc.)

[155] *Applications of Machine Learning to Classification and Analysis of Southwestern U.S. Ceramic Designs*

Recent advances in hardware and software have made implementation of advanced machine learning algorithms for image classification and analysis faster and more accessible. We demonstrate the applicability of machine learning to the classification and analysis of common decorated ceramic types from Northern Arizona. Both supervised and unsupervised learning algorithms are used to investigate standard ceramic typologies, as well as design/temporal similarities/differences between different ceramic design types.

Pawlowicz, Matthew [285] see Walshaw, Sarah

Paynter, Robert (UMass Amherst)

[311] *Discussant*

Pazmiño, Estanislao

[220] *Spondylus, Mounds, and Pyramids: An Approach to Social Changes in the Northern Andes of Ecuador during the Late Period*

During the precolumbian period, the northern Andes hosted an intense cultural interaction that led to the emergence of chiefdoms with diverse forms of political administration, power strategies, and economic integration. For the northern Andes of Ecuador, the archaeological research typically assumes a gradual development of the Cara people during the Late Period between AD 600 and 1525. New archaeological evidence of social and natural events suggests a transitional stage between AD 900 and 1200 that triggered the transformation of late political systems. Evidence of a significant decrease after AD 800 in the acquisition of exotic and sumptuary objects elaborated in gold, copper, and marine shells (such as the sacred spondylus) may have been related with an increase in the construction of mounds and pyramids in the region that took place until the presence of the Inkas. In this paper, I

discuss the evidence from different mound and non-mound sites in a regional context in order to document the development of social complexity in the northern Andes.

Pazzarossi, Guido [159] see Kennedy, Ryan

Peabody, Elizabeth (University of Central Florida) and Sarah Barber (University of Central Florida)

[82] *A Contextual and Iconographic Analysis of Precolumbian Stamps from the Lower Rio Verde Valley*

Known as estampias, pintaderas, or sellos, ceramic stamps are known from precolumbian sites throughout Mexico although very little research has been done on this group of artifacts. Previously published examples depict a wide range of iconographic themes, including geometric, floral, and faunal designs. This paper presents an analysis of 19 ceramic stamps recovered from excavations in the lower Río Verde valley. This group of artifacts spans nearly the entire precolumbian period, from the Late Formative through Late Postclassic periods (circa 300 BC–AD 1522). Given the rarity of these objects, they will be contextualized in reference to examples from various museum collections throughout the world. Focusing on the coastal Oaxaca examples, this paper will determine the frequency of ceramic stamps, patterns in their use, and attempt to determine their function. In contrast with explanations derived from other regions, there is no evidence that stamps were used to decorate pottery in the lower Verde. Instead, we propose that the importance of stamps lay in their capacity to temporarily transform the objects on which they were used. While further data are needed, we suggest that stamps were used for paper marking or temporary body modification.

Peacock, Evan (Mississippi State University)

[377] *Temper, Temper: Variability in Ceramic Paste Recipes at a Mississippian/Protohistoric Village in Northeastern Mississippi*

Mississippian-period pottery in the eastern United States is overwhelmingly described as “shell tempered,” with occasional reference to poorly defined “paste” categories in traditional typologies. Researchers recently have begun to note a high level of variability in the kinds of additional temper added to what macroscopically appears to be shell-tempered wares. An example is provided by the ceramic assemblage from Lyon’s Bluff (22OK520), a mound and village site in northeast Mississippi dating from ca. AD 1200—1650, where analysis via low-power magnification and petrography reveals three to four common temper constituents included with mussel shell. Three different hypotheses potentially explaining this phenomenon are examined: temper variability represents 1) the in-movement of people from different areas; 2) functional characteristics related to vessel production and/or performance; or 3) local-scale signaling associated with the high-visibility production of pots.

[314] *Discussant*

Peacock, Taylor (University of Victoria) and Ally Poniedzielnik (University of Victoria)

[263] *Hebrew Inscription Preservation in a Jewish Cemetery*

Inscription preservation and study is an important part of heritage and historical archaeology. Particular to Jewish cemeteries and their communities is the presence of Hebrew inscriptions such as blessings, or the deceased’s Hebrew name. Our project focused specifically on comparing rates of weathering between Hebrew and English, and we hypothesized that Hebrew inscriptions decayed faster than English ones. We estimated that Hebrew inscription would decay faster because of the curvature of the Hebrew alphabet, and the use of small characters, like the yod. Our site was the Congregation Emanu-el Cemetery in Victoria BC, and our sample consisted of 23 monuments of varying sizes, materials and inscription types across the cemetery. The monuments were dated prior to the 1960s, and contained both English and Hebrew. Our primary methodology was comparative observation, relying on photographs as records. Our results suggested that Hebrew inscription decays faster than English inscription. Second, factors that affect this weathering include the size and shape of monuments: larger monuments and granite preserved best. Results from this study also indicated that the placement of Hebrew inscription on a monument and the depth of the inscription carving are significant factors in rates of weathering.

Pearsall, Deborah M. [180] see Duncan, Neil

Pearson, Jessica [73] see Betz, Barbara

Peart, Daniel [152] see Sender, Rachel

Pebe, Edines (Proyecto Qhapaq Ñan—Ministerio de Cultura del Peru) and Bryan Núñez Aparcana

[56] *Inca Road Emplacement: The Case of Canturillas–Nieve-Nieve in the Lurin Valley, Huarochirí, Lima, Peru*

The Qhapaq Ñan or Great Inca Road was declared World Heritage by UNESCO in June 2014. The section of the road located between Pachacamac Sanctuary and the Inca administrative center of Hatun Xauxa (central highlands of Peru), is one of the most important, and one of the segments considered for the UNESCO declaration. Within this portion, the stretch from Canturillas to Nieve-Nieve is located near to the modern town of Nieve Nieve in a desert area, right where the Andes start rising, and dissected by the Lurin River and the streams descending to the central coast of Peru. This study presents a preliminary analysis of the architectural features of the Canturillas–Nieve-Nieve segment, based on a comparison with nearby sections of the road, taking into account the relevance of related sites of Balconcillo de Avilay and Nieve Nieve.

Pecci, Alessandra (University of Barcelona)

[274] *Chair*

Pecci, Alessandra [274] see Lancelotti, Carla

Pecha, Mark [237] see Britton, Emma

Peche-Quilichini, Kewin [261] see Tafani, Aurelien

Pedri, Marta Adriana [384] see Miller, Paul R. M.

Peebles, Giovanna
[150] *Discussant*

Peebles, Matt (Arizona State University), Barbara Mills (University of Arizona) and Jeffery Clark (Archaeology Southwest)
[227] *Tackling the Big Challenges of Big Data: An Example from the U.S. Southwest*

We see archaeology in the twenty-first century as an increasingly cumulative enterprise. The sheer volume of data produced in recent years has both facilitated and necessitated new approaches to synthesis that involve the compilation of massive databases and the development of new platforms for archiving and accessing data. "Big data" compilations are poised to be the backbone of many new advances but with "big data" come big challenges. In this presentation, we summarize several daunting issues we have faced while compiling and analyzing the Southwest Social Networks Project database; a collaborative effort that utilizes methods and models from network science to explore regional patterns of interaction and social change across the U.S. Southwest. Major issues have included assessments of data quality at various scales, the compilation of data from diverse sources, and the development of methods for sensitivity analysis to ensure that analytical results are robust to the many potential sources of error. While we are optimistic about the opportunities offered by this and similar data compilation efforts, we argue that archaeologists need to invest substantial effort in ensuring that the popularity of big data research does not outpace the development heuristic approaches for dealing with such data.

[315] *Discussant*

Peebles, Matt [130] see Mills, Barbara

Peixotto, Becca (American University), Ella Beaudoin (American University) and Emily Duncan (American University)
[259] *Snake Chaps and Shapefiles: Public Lidar as a Tool for Archaeological Exploration in Mid-Atlantic Wetlands*

The Great Dismal Swamp of Virginia and North Carolina was home to disenfranchised Native Americans, enslaved canal company laborers and maroons who lived in the wetlands temporarily and long term ca. 1660–1860. In the past decade, the Great Dismal Swamp Landscape Study (GDSLS) has intensively investigated only a few maroon and enslaved labor sites, leaving vast swaths of inhospitable and challenging swampland archaeologically unexplored. Current research seeks to identify new sites in remote areas of the Great Dismal Swamp National Wildlife Refuge. Publicly accessible lidar data, coupled with historic land documents, facilitates study of this difficult to access region by allowing researchers to identify and locate specific topographic features of interest, build terrain models and target specific areas for field survey. This reduces impact on the environment and on the field budget. This poster explains the methodology and initial results of the most recent exploration efforts in the Great Dismal Swamp. Filling in gaps in the map will expand our knowledge of the complex physical and social landscape of the Swamp and support future stewardship of the archaeological resources in the area.

Peles, Ashley (UNC Chapel Hill)
[372] *Discussant*

Peles, Ashley [385] see Kassabaum, Megan

Pelton, Spencer (University of Wyoming)
[286] *Communal Hunting Facilities as a Record of Human Cooperation*

Communal hunting facilities such as drive walls, hunting pits, and other features, are one of archaeologists' most direct proxies for past human cooperation. At the least, communal hunting facilities are unambiguous evidence for past cooperative effort. They are also informative of the nature of that cooperation, since variation in facility size and configuration should reflect variation in cooperative behavior. In this study, I present a model designed to understand variation in communal hunting facilities. I then test the expectations of that model by presenting a comparative analysis between communal hunting facilities in North America and Eurasia. I conclude by suggesting that communal hunting facilities inform not only the origins of cooperative behavior, but also its evolution alongside larger sociopolitical processes.

Peltzer, Alexander [203] see Krause, Johannes

Peña, Jose
[222] *Casma Pottery Production at El Campanario Site, Huarmey Valley, Peru*

Pottery production was an important aspect of the social and economic life within Andean societies. In preindustrial societies craft production occurred at the household level and depending upon the social complexity, this production was either independent or sponsored by the elite. Recent archaeological excavation of domestic contexts at the El Campanario site revealed that the area was occupied by the Casma polity during the Middle Horizon (AD 600–1000). This coastal polity occupied the southern region of Peru's northern coast and their distinctive ceramic style included Casma Molded, Casma Incise, and Casma Serpentine Applique. These styles were also recovered at El Campanario along with evidence of pottery production; moreover, molds, polishing stones, deformed vessels, and unfired clay suggest the presence of a pottery workshop at the site. In addition, the presence of potter's marks on some of the recovered pottery and the restricted distribution of pottery molds at the site suggests that pottery production did not occur within each household, instead it is most likely that pottery production at El Campanario was conducted in a specialized and communal workshop.

Pena-Chocarro, Leonor (IH-CSIC) and Guillem Pérez Jordà (IH-CSIC)
[275] *The Use of Dung in Northern Morocco: Examples from Mountain Communities*

This presentation focuses on the various examples collected from northern Morocco during ethnographic fieldwork on the use of dung. Apart from the most known use of dung as fuel, traditional communities in the Moroccan Rif used dung for other purposes such as flooring, tempering, manuring, making containers for storage, etc. This paper will discuss the various uses of this important material and results will be compared to other examples from other Mediterranean areas.

[275] *Discussant*

Penfil, Rachael (University of Illinois at Chicago), Patrick Ryan Williams (Field Museum), M. Elizabeth Grávalos (University of Illinois at Chicago) and Lauren Monz (Northwestern University)

[62] *Craft Production at Cerro Baúl: Unattached Specialization on the Wari Frontier*

This paper presents preliminary analysis and interpretations of a craft production space located within a single residential patio group on the summit of Cerro Baúl, located in the Moquegua Valley of Peru on the Wari-Tiwanaku frontier. Excavations in a patio group located close to a Tiwanaku temple exposed a dense artifact midden which included obsidian points and debitage, shell and lithic beads, burnt ceramics, and bone. Evidence of subfloor offerings, marked by multiple cuy internments in the western half of one of the rooms, reflect religious ritual in the dedication of the space. The discovery of such a diverse artifact scatter has led us to revise our initial interpretations of the space as an obsidian workshop to a more generalized craft production space with potential ties to ritual components within the Wari Empire.

Peng, Fei (Institute of Vertebrate Paleontology and Paleoanthropology), Sam Lin (Centre for Archaeological Science, University), Nicolas Zwyns (Department of Anthropology, University of Calif), Jialong Guo (Institute of Cultural Relics and Archaeology of) and Xing Gao (Institute of Vertebrate Paleontology and Paleo)

[113] *Preliminary Results from the New Excavation at the Upper Paleolithic Site of Shuidonggou Locality 2, Ningxia (China)*

Shuidonggou, a site complex containing multiple Upper Paleolithic localities in Ningxia Province, China, is one of a few archaeological examples in North China that contain artifacts of a blade technology similar to those of the Initial Upper Paleolithic (IUP) in Mongolia and Siberia 30–40 ka. At Locality 2, the occurrence of two blade cores in the lower layers dated to ~34–41 ka; and has led the lithic industry of the locality to be separated into those of the so-called IUP and others of the core-and-flake technology. This is characteristic of the Paleolithic in northern China between 1.6 ma and ~30 ka. However, due to the limited sample of artifacts' diagnostics of the IUP blade technology and a lack of consistent dates, the timing and technological affinity represented at Locality 2 remains unclear. There are reported preliminary results from a renewed excavation of Locality 2 beginning in 2014. The lithic assemblages of culture layers 1–3 are characterized by the typical core-and-flake technology of the Chinese Paleolithic, although variation between bipolar and free-hand percussion was identified. In addition, numerous ostrich egg shell beads and a single bone pendant were also recovered from the upper layers.

Peng, Shanguo

[25] *New Archaeological Discoveries of Liao and Jin City Sites in Jilin Province, China*

Archaeology at Liao and Jin sites in western Jilin Province has enormously increased our understanding of Liao and Jin period history and social organization. At the Chengsijazi site, temple remains were excavated and a ceramic architectural element was found with "Ninth year of Da'an" written on it. This site is the Liao city of Changchunzhou and the Jin city of Xintaizhou. At the Tahu city site, structures lining both sides of the north-south site axis were excavated and many ceramics were found. This site was Zhaozhou city of the Jin Dynasty, and used through the Yuan Dynasty. Work at these sites solved long-standing issues in historical geography concerning the regional government system. The spring Nabo site cluster contained a rare, large platform, and is considered the location of the Liao and Jin period migratory or Nabo spring encampment, a significant discovery for understanding the Liao and Jin governmental system. The Liao and Jin temple excavated at the Shuiping site is an important contribution to the study of Buddhism in the northeast. The Yinjiawopu site is a Jin Dynasty salt production site belonging to the Zhaozhou salt fields, and is the first salt production site found in the northeast.

Pennock, Hilary [46] see Muir, Robert

Pentney, Sandra (Atkins)

[1] *Discussant*

Pentney, Sandra [300] see Downs, Lauren

Perales, Manuel

[358] *Between the Puna and the Valley: An Approximation to Local Communities-Inca State Interactions through Road Network Analysis in Jauja, Central Peru*

Research on the Inca occupation in the conquered territories usually addressed the topic from a perspective that has been built on data obtained from state and local sites. The case of Jauja in the central highlands of Peru has not been the exception and much of our current knowledge about the Inca occupation of the region is based on information coming from indigenous settlements and state facilities. This paper proposes an alternative and complementary insight, trying to reach an approach to the interactions between local communities and the Inca state through the analysis of a road network articulated to the Qhapaq Ñan in the area located to the west of the administrative and religious center of Hatun Xauxa, and directly associated to the road that linked that site with Pachacamac in the central Peruvian coast.

Peraza Lope, Carlos [9] see Cissell, Madison

Perea, Ema (Pontifical Catholic University of Peru), Karla Patroni (Pontifical Catholic University of Peru), Luis Jaime Castillo (Pontifical Catholic University of Peru) and Luis Muro (Stanford University)

[233] *Lambayeque Burials in Huaca La Capilla—San Jose de Moro Site*

Huaca La Capilla is one of the best preserved architectural mounds in the archaeological site of San Jose de Moro. Its construction corresponds to the Late Moche period, but extends its occupation after its closure. Excavations in the units 55 and 64, located on the northern slope of the mound gives us an approximation to the function that had the structure after the Moche period. This poster presents the results of two field campaigns conducted in 2015 and 2016 where 40 burials of the Lambayeque period were recorded in an total area of 50 m². This case study provides important information regarding how social memory was constructed by social groups in the north coast of Peru.

Peregrine, Peter (Lawrence University and the Santa Fe Institute)

[393] *Information Exchange in the Postclassic Oikoumene: A View from Midcontinental North America*

Several years ago Steve Lekson and I proposed a Postclassic Oikoumene stretching from Mesoamerica through the Southwest and into midcontinental North America. A frequent question has been how such a "known world" could have been created in the absence of long-distance trade and transportation systems. In this paper I explore how information was exchanged among the peoples of midcontinental North America in the late

prehistoric and early historic periods. I examine how hunters and gatherers serve as instruments of information exchange between sedentary agricultural communities around the world. And I argue that maize carried with it important cosmological, calendrical, and astronomical information that formed the basis of what we see empirically as a broadly similar iconography of supernatural beings within the Postclassic Oikoumene.

Pereira, Carla (Texas A&M University)

[261] *The Dimensions of Tektaş Burnu: The Benefits of Computer Generated Modeling in Archaeology*

Tektaş Burnu is a Classical Greek shipwreck from the fifth century BCE which sank off the coast of Tektaş Burnu, Turkey. Excavated between 1999 and 2001, this ship was found to carry a cargo of, pine tar, pottery, kitchen tools, and wine in over 200 potentially Erythraean amphorae. The ship itself was consumed by shipworms so the size was determined by the location of the cargo, a pair of marble ophthalmoi and lead-filled anchor stocks. This project has taken the findings from this excavation—the remaining amphorae, anchor stocks, and the ship's metal fastenings—and used them to render a potential model of the ship, and digitally re-create the entire catalog of amphorae and anchor stocks using Rhinoceros 5.0 digital modeling software. Once scaled and combined into a single file, the project aims to “load” the render of Tektaş Burnu to determine whether the estimates of size are accurate, and if there would have been space for a now lost organic cargo. With the assistance of the Rhinoceros add-in Orca 3D, the project further hopes to determine the seaworthiness of such a ship, and what its marine capabilities and hydrostatic qualities might be.

Pereira, Telmo (Faculdade de Ciências Humanas e Sociais)

[165] *The End of an Era: The Final Moments of the Pleistocene-like Hunter-Gatherer Lifeway in the Westernmost Eurasian Site of Pena d'Água (Portugal)*

The 8.2 ky cal BP climatic event seem to have had a striking impact in the western coast of the Iberian Peninsula, where the hunter-gatherer populations kept their Pleistocene-like lifeway until (and possibly through) this event, after which emerged the Mesolithic societies. We present a detailed overview of the Epipaleolithic occupation of Pena d'Água Rockshelter (8.19 ky cal BP) as study case of these final moments, focusing the lithic economic patterns, namely the different patterns of acquisition, usage, blank morphometry and retouch on quartzite, quartz, and chert, which contrast with the later “blade-and-trapezium” techno-complexes.

[40] *Chair*

Pereira, Telmo [40] see Marreiros, Joao

Pereira Magalhães, Marcos [327] see Schmidt, Morgan

Peres, Tanya (Florida State University), Renee Walker (SUNY-Oneonta) and George Crothers (University of Kentucky)

[61] *Archaic Fishing in the Eastern Woodlands: An Examination of Social Causes and Environmental Variation*

The Eastern Archaic Faunal Working Group brings together researchers and nearly sixty faunal datasets representing twenty-one sites from four major subregions of the Eastern Woodlands. In this paper, we focus on resource availability and the potential causal relationship to cultural choice. The Archaic Period archaeological sites in our study are located in the Mid-South and Ohio River Valley regions, and are well-known for their composition of shell in the form of middens or mounds. In a previous analysis, Walker and Peres (2016) compared the use of aquatic resources between two sites located in the Mid-South region. The results indicated that while people at both sites focused on the exploitation of aquatic resources, there were significant differences in which species were targeted. The current research builds on this by integrating datasets from the Mid-South and Ohio River Valley regions using the data integration tools in tDAR. The aim of this study is to determine the spatial variability in aquatic resource use and correlate these patterns to cultural questions of broad concern: site function, dietary choice, and environmental variability.

Peres, Tanya [340] see Ledford, Kelly

Peresani, Marco, Davide Delpiano (University of Ferrara), Kristen Heasley (University of Southampton), Nicola Nannini (University of Ferrara) and Matteo Romandini (University of Ferrara)

[169] *Tool Kits, Subsistence, and Land-Use Patterns: The Neanderthal Ecology Revisited across a Dense Cultural Sequence in the Alpine Chain*

Studies of the way Neanderthal groups used knapping technologies and organized their economy and land use are sparse in Europe and even scantier in the Alps, so only in some regions can cyclical and seasonal residential movements be inferred from data on the exploitation of ungulates with variable levels of migratory behavior. Two of the most widespread methods used in stone knapping were the Discoidal and Levallois. However, analyses of these lithic artifacts are not yet sufficiently integrated into a corpus of zooarchaeological indicators that outline an ecological profile of Neanderthal mobility. To address this issue, this study presents evidence from Grotta di Fumane in northern Italy, where the use of manufacturing technologies is embedded in a dense Late Mousterian sequence. Given the specific ecological and contextual setting on the Southern Alps, we assume that Neanderthals exploited knappable rocks balancing transport costs and utility and that hunting activity was shaped by the availability of game and that well-established, cost-effective patterns were used in carcass processing. Compared on a broader scale with other contexts, these foraging practices show striking differences each other and suggest that a common model for Neanderthal subsistence strategy cannot be applied.

Peresani, Marco [389] see Riel-Salvatore, Julien

Peresolak, Katherine (Indiana University of Pennsylvania)

[260] *Advocating for the Morrow Jones Cabin: Archaeological Investigations at a Historic Homestead*

The Pennsylvania Department of Conservation and Natural Resources (DCNR) manages over 2 million acres of state land. Forbes State Forest, located in Fayette County, Pennsylvania, is home to numerous cultural resources, including the Morrow Jones cabin. Given its location on state-owned property, neglect and natural decay are greater threats to this historic house than development, yet DCNR has limited funding and a finite amount of time to devote to such resources. Detailed study of this house and property will result in an occupational history and site analysis. Four research questions are proposed in this archaeological investigation. The primary question concerns age and use life of the house, since DCNR would like their staff and the public to better understand the history and significance of the Morrow Jones cabin and its associated derelict farm. Demographics and domestic activities of the site are also of interest in order to better understand the families occupying this rural area. The physical evolution of the house and the farm's connection, or lack thereof, to local and regional economic markets form the final two questions.

Pérez, Carmen (Doctorado en Estudios Mesoamericanos FFyL-UNAM), Yoko Sugiura (UNAM) and Wesley Stoner (Arkansas University)

[215] *Producción y consumo de la cerámica Coyotlatelco: El caso del valle de Toluca en el Epiclásico*

La cerámica Coyotlatelco ha jugado un papel importante en el Epiclásico del Altiplano Central de México. Dicho complejo cerámico se constituye por formas de servicio como ollas, cazuelas, cajetes, platos y vasos, y exhibe características definidas por un alto grado de pulimento y decoración pintada en rojo sobre bayo, cremoso o blanco. Los resultados del análisis NAA y el estilístico, realizados al Coyotlatelco tanto de la cuenca de México como del valle de Toluca señalan que éste no parece provenir en un centro único de producción, sino de varias localidades al interior de dicha región y que se distribuye en gran parte del Altiplano Central mediante intercambios locales y regionales.

Pérez, Jan (University of Puerto Rico, Rio Piedras Campus) and Isabel Rivera-Collazo (University of California San Diego)

[69] *Using Surface Chemical Markers to Identify Patterns of Human Activity: The Case of Tierras Nuevas, Puerto Rico*

Human activities leave chemical traces in the sediments, which can give us clues about the content of the subsoil and the activities that might have occurred in the past. In this study we evaluate the potential of the geochemical evaluation of sediment samples collected from surface survey for the identification of buried patterns of human activity at the site of Tierras Nuevas, is an archaeological site in a tropical environment. Based on topographical characteristics, we had identified patterns of mounds and ball courts at the site but very few or no archaeological artifacts were visible. This study sampled the surface along parallel transects and analyzed their phosphate content and their pH levels. The analyses show high correlation between the patterns of geochemical characteristics with the different types of earthen features on the site. This study shows the potential of noninvasive geochemical and geoarchaeological testing for the identification of archaeological patterns of human activity, and leaves an open door to continue developing this type of methodology in the Caribbean.

Pérez, Julia [174] see Ortíz, Laura

Pérez, María Fernanda [222] see Vidal Elgueta, Alejandra

Pérez Alcántara, Ivonne (Posgrado Estudios Mesoamericanos), Lane F. Fargher (Centro de Investigación y de Estudios Avanzados de), Verénice Y. Heredia Espinoza (Centro de Estudios Arqueológicos-El Colegio de Mic), Richard Blanton (Purdue University) and John K. Millhauser (North Carolina State University)

[215] *El Estado tlaxcalteca, el intercambio y la economía doméstica: Un estudio sobre la relación entre la producción, el consumo, y la política comercial de un estado colectivo*

Las investigaciones arqueológicas e históricas sobre la ciudad y estado Posclásico de Tlaxcallan muestran que éstos fueron construidos a través de estrategias político-económicas altamente colectivas. El resultado de dichas estrategias fue una República que enfatizó la toma de decisiones por consejo, la justicia social, el reconocimiento de mérito y el abasto de bienes públicos (especialmente seguridad pública y redistribución de riqueza acumulada por el Estado). La prospección sistemática de la ciudad y excavaciones en los distritos urbanos de Tepeticpac y Ocotelulco han permitido conocer las características económicas de las unidades habitacionales hacia el Posclásico Tardío. En esta ponencia investigamos el impacto de las políticas colectivas en la economía doméstica, así como la producción y el consumo de bienes enfocándonos en los contextos sociales y la intensidad de la producción de textiles, así como en el consumo de la cerámica policroma y foránea. Con base en estos datos evaluamos la codificación social de esos bienes y su relación con las políticas estatales de comercio.

Pérez Calderón, Juan Carlos [174] see Cagnato, Clarissa

Pérez Castellanos, Nora A. [215] see López Corral, Aurelio

Pérez Cubas, Kelita [308] see Tantaleán, Henry

Pérez-Juez, Amalia (Boston University), Kathryn Ness (Boston University), Ricardo Elia (Boston University), Meredith Anderson Langlitz (Archaeological Institute of America) and Ilaria Patania (Boston University)

[234] *Reconstructing Naval and Shipping Connections through Ceramic Analysis from Isla del Rey, Menorca, Spain*

Isla del Rey is a small off-shore islet, located on the Spanish Balearic Island of Menorca. The island is well-known for a British Naval Hospital, constructed over multiple periods of British occupation in the eighteenth century. The hospital was used for 250 years by the British, French, and Spanish, and abandoned in the second half of the twentieth century. In 2013, the Boston University Field School in Archaeology and Heritage Management began investigating the building, which had not been previously explored archaeologically. The material found showed the tight links of Menorca with other parts of Europe, from the Mediterranean to the Western Atlantic. Pottery from Italy, England, and Spain arrived to Menorca by ship. It was used on site and imitated locally. Because pottery factories often imitated each other, it is difficult to assess the provenience of some pieces, except through additional analyses such as Neutron Activation Analysis (NAA) that allow scholars to pair ceramics with clay source locations. In this poster we will present recent findings at Isla del Rey including a discussion of the pottery, its link to other countries, and the results of the NAA analysis conducted on so-called Ligurian pottery.

Pérez Jordà, Guillem [275] see Pena-Chocarro, Leonor

Pérez Pérez, Julia (Proyecto Templo Mayor), Carmen Cristina Adriano-Morán (Laboratorio de Paleoetnobotánica y Paleoambiente) and Ximena M. Chávez Balderas (Proyecto Templo Mayor)

[293] *Analysis of Microbotanical Remains from Dental Calculus: A New Approach for Ancient Diet Studies*

Paleodiet analysis from individuals found inside the Great Temple ritual deposits have been successfully conducted by analyzing carbon and nitrogen isotopes, with the aim of distinguishing between marine and terrestrial diets. Recently, we incorporated microbotanical analysis of dental calculus to these studies in order to search for plants remains, with the goal of having a broad picture of ancient diet and paramasticatory use of the oral cavity. For this purpose we selected individuals with severe dental calculus (plaque). Inside these residues we can find microbotanical remains, such as grains starch, pollen, phytoliths and fibers. In this paper we will present preliminary results on the analysis of five individuals found inside Offering 20, all of them presenting severe dental calculus, when comparing to other skeletons discovered inside other ritual deposits. At this point we have identified the

presence of Agave sp. fibers and cells, proving that this plant was consumed not only as an alcoholic beverage during certain ceremonies, but also the maguey's heart or pine, was utilized as part of the diet.

Pérez Robles, Griselda [174] see Cagnato, Clarissa

Pérez Roldán, Gilberto [94] see Robles Martínez, Edsel Rafael

Perhay, Nathaniel (University of Montana), Nathan Goodale (Hamilton College), David G. Bailey (Hamilton College), Alissa Nauman (Hamilton College) and Anna Marie Prentiss (University of Montana)

[50] *A Geochemical Investigation and Spatial Analysis of the Earliest Living Floors of Housepit 54, Bridge River, British Columbia*

A geochemical investigation of the early floors of Housepit 54 provides insight into the daily activities of household occupants. Excavations of Housepit 54 revealed 17 superimposed floors and roofs. The earliest dating floors were excavated in 2016 with sediment samples systematically collected across each floor level. In this study we use both EDXRF and WDXRF techniques to provide reliable compositional data on the floor sediments. With the use of XRF data and geospatial tools we are able to reconstruct variation in the organization of activities across floors that may or may not be reflected in distributions of artifacts and subsistence remains. Implications for understanding household activity areas and recommendations for future research of this nature are offered.

Perkins, Leslie and Travis Stanton (University of California Riverside)

[179] *Tan Tun: The Enduring Role of Cozumel in the Maya World*

The island of Cozumel has long been known to have been a quintessential place in Late Postclassic Maya culture as the home to the shrine of Ix Chel, the lunar goddess of childbirth and fertility. Maya women of this period were expected to make the pilgrimage to the shrine at least once in their lives, which would have transformed the island into one of the most dynamic and multicultural social contexts throughout the late Maya world. Added to the fact that the island is the easternmost part of the Maya area and was known to have one of the most important marketplaces in the Maya region during the Late Postclassic, Cozumel was beyond doubt a unique place that greatly factored in to the geopolitics of the time. Occupation on the island, however, dates back at least until the Terminal Preclassic period, suggesting that the importance of the island stretches back into a more distant past. In this paper we discuss our current research at El Ramonal and San Gervasio with the idea of understanding the Preclassic and Classic origins of Cozumel as the unique multicultural place it was during the Late Postclassic.

Perla Barrera, Divina [125] see Sion, Julien

Perlingieri, Cinzia (CoDA—Center for Digital Archaeology), Kelley Shanahan (CoDA—Center for Digital Archaeology) and Elena Toffalori (CoDA—Center for Digital Archaeology)

[37] *The Anthropology of Data Design and Project Strategy*

Much of what we do today as archaeologists and cultural heritage professionals is designing digital projects. From organizing field documentation methodologies to processing, analysis, publication, and sharing, we design workflows based on how content is best represented in a digital format. Transition to digital form is still rarely linear, even more so when you help others adopt digital solutions for their content. Given the cultural nature of projects we work on, at CoDA, we have adopted a human-centered approach to digital project design, where understanding and translating people's needs come before choosing what technology to use. We engage in deep anthropological inquiry that focuses on humans' interaction with materials and knowledge before deciding on technology, workflow, and data structure. Inspired by the topic of this session, we reflect on how adopting a human-centered approach to digital project design can facilitate adoption of digital solutions. We share some of our user experience stories and what we have learned from them. We hope to inspire the audience toward changing our approach as technologists from being carriers of digital agendas toward more meaningful, impactful, and sustainable cultural digital projects.

Perreault, Charles [91] see Miltimore, Derek

Perri, Angela [156] see Cooper, Catherine G.

Perrotti, Angelina (Texas A&M University)

[371] *Paleoenvironmental Change during the Pleistocene-Holocene Transition at Sloth Hole (8JE121), Northwestern Florida: A Palynological Perspective*

This paper presents the preliminary results of a palynological investigation of sediments from Sloth Hole (8JE121), a site in the Aucilla River. The Aucilla River in northwestern Florida creates a unique preservation environment that has produced rich cultural, faunal and botanical records from the Late Pleistocene to the present. Archaeologists and recreational divers alike have recovered probable Paleoindian-aged bifaces and a possible butchered mastodon fibula from Sloth Hole. In addition, an ivory tool recovered from this site has yielded a Clovis-age date. Recent palynological research at nearby Page-Ladson (8JE591) demonstrated significant variability in both the plant and herbivore communities during the Pleistocene-Holocene transition. Many of the same patterns are reflected in the Sloth Hole sediments, suggesting a regional pattern of plant community change preceding and following megafaunal disappearance in the area. These environmental changes occur during a shift from Paleoindian to Archaic lifeways, when regional tool technologies appear to reflect a move to a more generalized diet, perhaps in part as a response to the disappearance of Late Pleistocene megafauna.

Perrotti, Angelina [81] see Carlson, David

Perry, Jennifer (CSU Channel Islands), Michael Glassow (University of California, Santa Barbara), Terry Joslin (Central Coast Archaeological Research Consultants), Kelly Minas (Channel Islands National Park) and Mark Neal (BeyondMaps)

[300] *Santa Barbara Island: Insights into the Prehistory of California's Channel Islands through Its Smallest Island*

As the smallest of California's Channel Islands, isolated and impoverished Santa Barbara Island has received less scholarly attention than its well-known neighbors. Initially described as a "way station" to the other islands, subsequent archaeological expeditions have reinforced the interpretation that the

island was only temporarily occupied in the Middle and Late Holocene. In 2012, an effort to rerecord the 19 known sites was undertaken. Subsequent surveys have increased the number of sites to 55 and radiocarbon samples to 20, dating between ~4100 and 600 cal. BP. Spatial and temporal patterns have emerged from this comparatively more robust dataset, allowing for better contextualization of the few previously excavated sites. Most of the island's sites are small shell and lithic scatters, although some are larger shell middens with greater faunal and artifact diversity. Their locations and constituents indicate that the island not only served as a stopover during interisland travel, but was also visited to target local resources such as sea mammal rookeries. Our recent research presents a unique opportunity to reevaluate the different roles that this island played in broader settlement and subsistence systems on the Channel Islands in the latter part of the Holocene.

Perry, Megan [92] see Propst, Akacia

Person, Dylan (University of Nevada, Las Vegas)

[390] *A Dance with Dragons*

What is the relationship between culture and the things that humans create? How do our beliefs affect what we make and how do these creations affect us in turn? This issue is investigated through study of horned water serpent iconography, imagery that is both ethnographically and archaeologically documented as ritually significant in the southwestern United States. This case study focuses on Cottonwood Spring Pueblo, a large aggregated settlement in the Jornada Mogollon culture branch. Salado polychrome pottery is used in the analysis due to its presence at the site, as well as the site's location on the far edge of Salado polychrome's geographic distribution. This supports conceptions of Cottonwood Spring as place where different social and ritual practices were a part of its aggregated community. The study uses the principles of behavioral archaeology to examine how objects existed in flows of communication that facilitated community integration and acceptance of religious practice. Communication process modeling provides a way for archaeologists to derive communicative meaning for ritual imagery through the process of logical inference. The analysis explores how materiality and art can influence human behavior in ritual practice and provides methods for obtaining such information from the archaeological record.

Perzinski, David [123] see Dega, Michael

Pesonen, Petro and Miikka Tallavaara (Dr)

[227] *Lidar Data and the Temporal Trends in the Frequency of Hunter-Gatherer Sites in the Northwest Coast of Finland 10,000–2000 cal BP*

Investigation of lidar visualizations has become a standard tool in archaeological site detection in Finland, as large part of the country has been lidar scanned. Because archaeologists alone do not have enough resources to thoroughly analyze these big data, part of the work has been crowd sourced. Thanks to active volunteers, not only the number of sites has increased, but we now have new types of sites, and sites in environmental contexts that have previously been ignored in archaeological surveys. Here, we use lidar-derived archaeological data together with data from traditional sources. We track changes in the temporal frequency distribution of hunter-gatherer house pit sites, sites without house pits, and sites with rectangular stone megastructures in northwestern Finland (N = 739). We show boom-and-bust cycles in the frequency of sites between 10,000 and 2000 cal BP. House pit sites and megastructures coincide with the last and the most prominent of the booms peaking at 5800–5700 cal BP. Interestingly, hunter-gatherers do not seem to recover from the subsequent bust, and the number of sites remains low until the end of the study period. We suggest that this is related to the cooling climate and declining productivity of the Baltic Sea.

Pestle, William (University of Miami)

[134] *The Interior Frontier: Intercultural Exchange in the Formative Period (1000 BC–AD 400) of Quillagua, Antofagasta Region, Northern Chile*

Today the modern village of Quillagua, an oasis in the hyperarid Atacama Desert, is of limited regional economic importance. However, there is strong evidence to support the argument that, in the past, the village was a node of ancient routes linking the populations of the Pampa, the Pacific Coast, the River Loa, and the Salar de Atacama. Documents from the eighteenth century suggest that Quillagua was, in fact, an "internal frontier" between populations residing to the north and south of the oasis. Archaeological evidence indicates that this border function may have its origins as early as the Formative Period (1000 BC–AD 400). In this work, we present the results of bioarchaeological, funerary, and isotopic analysis of individuals from distinct spatial/ethnic precincts of Quillagua, as well as settlements and cemeteries in the surrounding regions, in an attempt to characterize the direction, frequency, and intensity of interaction, exchange, and intercultural in the region during the Formative. In essence, we seek to examine how the border function of Quillagua was embodied and internalized by the people who lived and died in its environs.

[30] *Discussant*

Pestle, William [30] see Chinique de Armas, Yadira

Petchey, Fiona, Geoffrey Clark (Archaeology and Natural History, Australian Nation), Patrick O'Day (Garcia and Associates, Kailua, Hawaii) and Richard Jennings (Liverpool John Moores University, UK)

[32] *Radiocarbon Dating in the Mariana Islands*

One of the most enigmatic human dispersals into the Pacific is the colonization of the Mariana Islands. Here the interpretation of radiocarbon (14C) dates from early settlement sites is hotly debated. One interpretation suggests the Marianas were colonized directly from the northern Philippines around ~3500 BP. However, the age of one of the earliest Mariana sites; Bapot-1, has recently been revised down to ~3200–3080 cal BP following research by Petchey et al. (in press) which demonstrated that 14C depleted waters (hardwaters) had been incorporated into the estuarine *Anadara antiquata* shells, but not into shells belonging to reef dwelling animals. This research has demonstrated the importance of integrating radiocarbon, environmental and zoological information when building island chronologies. This presentation discusses our ongoing research into the marine 14C offsets in this region.

Peters, Kara [152] see Merritt, Stephen

Peterson, Elizabeth (Simon Fraser University)

[171] *Development of Craft Specialization during the Pre-Aksumite Period in Eastern Tigray, Ethiopia: Insights from Modern Hide-Workers*

The Pre-Aksumite period in Eastern Tigray witnessed social and economic changes that have been traditionally attributed to the impacts of external influences, in particular the Sabaeans. Recent studies are exploring internal or indigenous factors influencing the development of economies and early social inequality/complexity in the northern Horn. One such factor may have been the local development of craft specialists to cope with increasing demands for certain goods, such as hides. The export and trading of hides has continued as an important aspect of the modern Ethiopian economy, with possible roots in the early development of the Aksumite state. This paper presents the results of ethnoarchaeological and archaeological studies of

stone scrapers used to process hides. Through incorporating morphological analysis, low-power use wear, interviews and observations, identifiable trends associated with hide processing are evaluated. Studying the formation of craft specialists within this framework creates one means by which the development of social complexity/inequality can be explored for the Pre-Aksumite through the Early Aksumite periods allowing a focus to be placed on indigenous influences operating within the region.

[171] Chair

Peterson, Elizabeth [237] see Rogers, Thatcher

Peterson, Katherine

[287] *Archaeology, a Bone to Pick: Pitfalls of a Destructive Science*

Archaeology, as a science, has a long history, not all of which has been ideal. Archaeologists in one generation are routinely dismayed with the work of previous generations of archaeologists. Sometimes this less than satisfactory work is due to a lack of knowledge at the time, as we learn more with each new technological advancement, and with each new generation of archaeologists. However, more often than we would like, these flaws in past archaeological work are due to apathy or negligence. In either case, we lose much information. Archaeology, after all, is a destructive process. Once we choose to excavate, it can never be undone. Using excavation examples from the distant past, as well as more recent examples, I argue that archaeology still suffers much from this "dark side." With these examples in mind, I propose that as archaeologists, we attempt to fill in the gaps where we can, and to take the full responsibility of this destructive science seriously.

Peterson, Kristi (Florida State University)

[298] *Consumption and Construction: Art, Sacra, and the Place of Empire in Postclassic Mexico*

In the precolumbian era of Mexico, devotional objects served to reinforce existing cultural systems while simultaneously shaping the overarching aesthetic narrative. This presentation will explore the manner by which *ixiptla* (lit. representation), a type of central Mexican cult effigy, functioned to form the visual rhetoric that is illustrative and formative of conceptions of space, place, and cultural identity in the late Postclassic Period. Within the category of devotional images, *ixiptla* are unique in that they feature a conceptual continuity with human performers, as a ritual actor can be transformed into a representation. This link functions to essentially turn the performative body into a living, acting object, and furthermore lends the sculptural corpus an agentive function. This presentation will specifically address the broader visual systems in which *ixiptla* participated as an image type. This presentation concludes that sacred images are, as a class of representation, indices of collective memory and nostalgia through the mythic narratives inscribed upon the objects themselves and their usage. Within the visual systems employed by the city-states of central Mexico, sacred imagery was merely one of multiple mechanisms designed to pull the periphery to the center and to actively construct specific cultural narratives.

Peterson, Paige (University of Victoria) and Elisa Moes (University of Victoria)

[263] *Historic Cultural Perspectives through Cemetery Landscape*

The Jewish cemetery in Victoria, BC, is home to approximately 300 interments and is one of the oldest Jewish cemeteries in Canada and the second largest in western Canada. This study explores the Jewish community of Victoria during its earlier period of use from 1914–1918 using four individuals from a variety of economic, social, political, and gender specific backgrounds. The goal of this research was to investigate the biographies of four people buried at Emanu-El cemetery who died during the period of World War I, and to make connections between the individuals and their larger community. Using the grave memorials as a gateway into their lives, we take this public memorial of individuals who have lived and died over a hundred years ago, and extend their stories as much as possible, beyond the dates of birth and death. Research involved exploration of textual materials from a variety of institutions such as University of Victoria, BC, Archives, the Jewish Museum and Archives of BC, as well as from publications, newspapers, census data, military records, ship passenger lists, and online genealogy websites.

Pétrequin, Pierre [23] see Sheridan, Alison

Pettigrew, Devin [264] see Kay, Marvin

Petzelt, Barbara (Metlakatla Treaty Office)

[176] *The Metlakatla First Nation and Archaeology: An Indigenous Community's Views in the Course of 50 Years of Archaeological and Related Research in the Prince Rupert Harbour Region*

This paper discusses the Metlakatla First Nation's views and roles in the archaeological and related research that has occurred within their traditional territory over the past 50 years, the core of which is the Prince Rupert Harbour area. Unlike many other First Nations, Metlakatla has long embraced the opportunity to actively participate in the documentation of their ancient history, rather than merely being a subject of research. This view of archaeology has led to mutually beneficial relationships with researchers from academic archaeologists and CRM archaeologists to biological archaeologists and geneticists. All with the long view that the western world has difficulty accepting indigenous oral histories without corroborating evidence from the social sciences and science. More and more we are finding that these tools are confirming what the Metlakatla have known for millennia.

Peuramaki-Brown, Meaghan (Athabasca University) and Linda Howie (HD Analytical Solutions, Inc./Western University)

[236] *Precolumbian Ceramics in East-Central Belize: A Petrographic Characterization Study*

In 2015–2016, the Stann Creek Regional Archaeology Project (SCRAP) in collaboration with HD Analytical Solutions, initiated a preliminary petrographic characterization study of presumed "local" pottery and daub artifacts, surface collected during settlement survey at the Late to Terminal Classic (ca. 750–1000 CE) Maya site of Alabama, Belize. This initial study, though small, has proved mighty in terms of the new information it has revealed, building on earlier studies of Maya communities in the Stann Creek area by Elizabeth Graham and colleagues. Our data sheds light on geological variability in local raw materials for pottery and building materials; common pottery and daub fabrics; as well as local, mesolocal, regional, and long-distance interactions of the Alabama Maya of east-central Belize. In this presentation, we discuss the results of our study and their impact on the broader SCRAP research program at Alabama.

Peuramaki-Brown, Meaghan [337] see Haggard, Alyssa

Pezzarossi, Guido (Syracuse University)

[128] *Resisting Capitalocentrism: Heterogeneous Assemblages of Market and Anti-market Practices in Colonial Guatemala*

The consequences of Spanish colonial/capitalist intrusions into highland Guatemala is an emerging focus of archaeological investigation. While providing insight into the entanglements between colonialism and capitalism and their effects on Maya communities, it is critical to not fixate on finding capitalism and its effects to the exclusion of other patterns of practice and life central to the experience of people in the past. Overemphasizing capitalism in our analyses reifies the suffocating ubiquity of an abstract capitalism, foreclosing the possibility of other ways of being-in-the-world that were not capitalist, formed in relation to capitalism or in opposition to it. Instead, a holistic approach is needed that can examine instances wherein "capitalist" practices exist side-by-side and/or articulated with other practices—traditional and innovative—that exist outside of the unproductive two-step of either resistance to or engagement with capitalism. In this paper I use archival and archaeological research on colonial Maya sites in the piedmont and highland regions of Guatemala to piece together the spectrum of economic and productive practices carried out by colonial Maya communities; some coerced, some opportunistic of the emerging colonial economic landscape, and others having little to do with the intrusions of capitalist/colonial practices and effects.

[64] *Discussant*

[128] *Chair*

Pezzarossi, Guido [218] see Johnson, Katharine

Pezzutti, Florencia (Colorado State University), Christopher T. Fisher (Colorado State University), Conrad Albrecht (IBM-Watson), Sharathchandra Pankanti (IBM-Watson) and Francesca Rossi (IBM-Watson)

[118] *Automated Archaeological Feature Extraction from Lidar*

Here we present preliminary results from a collaborative project between archaeologists and IBM research scientists focused on developing a cost-efficient algorithm for the automated recognition of archaeological features (objects) from lidar data. Our research focuses on challenges of 1) multidisciplinary work integrating expertise from diverse disciplines, 2) identifying complex archaeological features in the context of a dense urban site in a rugged topographic setting, and 3) developing a machine learning algorithm to efficiently identify archaeological features. We will present details of formulation of our approach in addressing the above-mentioned research challenges and provide preliminary results on real archaeological data which we find promising. We believe this improved lidar object feature recognition algorithm will ultimately be a resourceful and cost efficient (both in money and time) tool for future archaeologists conducting archaeological surveys and mapping through the application of lidar.

Pfaffenroth, Jake (University of Wisconsin)

[299] *Cahokian Colony or Frontier Fusion? Architectural Variability and "Mississippianization" at Aztalan, Wisconsin*

The concept of a "frontier zone" in which diverse peoples would have been equally susceptible to each other's influences offers a dynamic and multi-scalar approach to the investigation of "Mississippianization" in Cahokia's northern hinterland. Aztalan, a site of Mississippian and Late Woodland co-residence in southern Wisconsin (ca. AD 1100–1200), has long been interpreted as a "Mississippian town" or "Cahokian colony." Mississippian-centric interpretations have led some archaeologists to suggest that Late Woodland people were a minority at Aztalan and/or were subjugated by Mississippians. I hypothesize that some aspects of the relations between Mississippian and Late Woodland peoples at Aztalan are reflected in the remnants of domestic architecture at the site. In the U.S. Midwest, Mississippian people typically built fairly uniform, rectangular, wall-trench buildings while structures built by Late Woodland people had various shapes and were constructed using single-set posts. My analysis of architectural variability at Aztalan indicates that few structures were typical Cahokian wall-trench buildings and many were "hybrids" that incorporated traditions from both cultural groups.

Pfeiffer, Susan (University of Toronto), Judith Sealy (University of Cape Town), Ronald F. Williamson (Archaeological Services, Inc.), Crystal Forrest (Ontario Ministry of Tourism, Culture and Sport) and Louis Lesage (Nation Huronne-Wendat, Wendake, Quebec)

[30] *Patterns of Weaning and Childhood Diets among Ancestral Huron-Wendat Communities, Determined from Stable Isotopes of Teeth*

We report here on the study of ancestral teeth retained after repatriation, with the permission and engagement of the Huron-Wendat Nation. We have documented temporal patterns in reliance on maize, as well as decisions about infant feeding. Significant differences between time periods before and after European incursions suggest concrete ways in which disruptions altered daily lives. Study of horizontal dentine slices from 74 teeth (35 deciduous molars, 39 permanent M1) from five communities, fourteenth to seventeenth centuries, shows initiation of weaning between 8 and 18 months and completion between 2.5 and 3.5 years. Weaned children ingested gender-differentiated diets that were proportionally different from adult diets. Weaning was completed a few weeks earlier in the sixteenth and seventeenth centuries, compared to prior times. This corresponds with the time when maize became a more prominent dietary component for all community members. Both shifts may reflect the impact of geographic and sociopolitical disruptions at that time.

Pfleging, Johannes [40] see Iovita, Radu

Pham, Son [113] see Kelley, Eric

Phelps, Danielle (University of Arizona)

[191] *Tutankhamun's Burial Assemblage: Normative or Atypical Mortuary Practices of the Eighteenth Dynasty of Ancient Egypt?*

The burial assemblage found in the tomb of Tutankhamun, a pharaoh of the Eighteenth Dynasty (circa 1330 BCE) of ancient Egypt, is one of the most renowned collection of artifacts to survive from antiquity. But does it fit within the normative mortuary practices of the Eighteenth Dynasty? A closer and more comprehensive examination of the material culture found in the tomb of Tutankhamun indicates that several normative patterns were followed; however, many of the artifacts suggests atypical practices most likely from the despoliation of the burial assemblages of Tutankhamun's predecessors.

Phelps, Leanne [325] see Kaplan, Jed

Phillips, Laura [228] see Sparaga, Joseph

Phillips, Lori (Washington State University), Erin Thornton (Washington State University), Kitty Emery (Florida Museum of Natural History, University of F) and Carlos Peraza Lope (Centro INAH Yucatán)

[340] *Let's Talk Turkey: Turkey Use and Management at Postclassic Mayapán*

The ancient Maya utilized two species of turkeys: the Ocellated Turkey (*Meleagris ocellata*) native to the Yucatán Peninsula, northern Guatemala, and northern Belize and the Wild Turkey (*Meleagris gallopavo*) from Central Mexico. The exact timing of Wild Turkey domestication and its introduction to the Maya area is unknown, although evidence as early as the Preclassic exists. The Ocellated Turkey was never fully domesticated but many scholars have proposed the Maya may have managed the species. To understand when the Wild Turkey was introduced to the Maya, whether the Ocellated Turkey was a managed species, and how these two species were treated compared to each other we used a combination of osteometrics, demographic profiles, and stable carbon and nitrogen isotope analysis on turkey remains from the Postclassic site of Mayapán. Previous research here found an abundance of Ocellated Turkeys hypothesized as an example of animal management and an absence of Wild Turkeys. Our results show the presence of both species however isotopic analysis reveals a difference in diet between the two, interpreted here as a difference in animal management strategies. In this paper we discuss these isotopic differences and the implications they have for understanding ancient Maya human and animal relationships.

Pi, Loro Qianhui [231] see Velasco, Matthew

Picard, Jennifer (University of Wisconsin-Milwaukee Cultural Resources Management), Alexander Anthony (University of Wisconsin-Milwaukee) and John Richards (University of Wisconsin-Milwaukee)**[188] *Forward and "Faug a Balac": An Irish Immigrant Family Dugout in Wisconsin***

Much of the historical research on Irish immigrants, particularly women and children, focuses on those who moved to urban areas during the time of the Famine. Less has been written about Irish immigration prior to the famine, particularly to rural areas. The McHugh family immigrated to the United States in 1825, settling in Waupaca County, Wisconsin, circa 1849. The McHugh site (47WP0294) was occupied by this family for over a century. Following her husband's death in 1856, Mary McHugh was left to run the household. This was further complicated by the involvement of her eldest sons in the U.S. Civil War. The earliest occupation of the site is somewhat obscured by the heavy material culture presence of later generations of McHughs. The absence of material culture from the earliest period, coupled with the archaeological signature of a dugout house structure, provide insight into the lives of pioneer immigrant families in the region, and into the struggles of a female-headed household with many young children. Mid-nineteenth-century Irish immigrants to the frontier may have had more in common with contemporary rural lifeways in Ireland than with their brethren in the urban Irish diaspora.

Picard, Chris [176] see Chalmer, Nyra

Picin, Andrea (Friedrich Schiller University of Jena)**[389] *Neanderthal Short-Term Occupations in Open-Air Sites: An Overview from Eastern Germany***

Prehistoric hunter-gatherers frequently relocated in order to avoid foraging in previously depleted areas, and lakes and rivers played important roles in these movements as fix locations on the landscape where foragers could have access to water and ambush parched animals. The types of human occupations along lakes and rivers could have been various according to the aims of displacements (e.g., logistical, residential) and the activities carried out at the shore (e.g., bivouac, hunting station, base camp). Repeated settlements on the same areas could have generated palimpsests rich of archaeological artifacts that are not always easy to disentangle and interpret. However, the discrimination of the raw materials and the comparison of the lithic assemblages with experimental knapping materials could be indicative of the integrity of the operative chains and the type of artifacts transported off-site. This paper aims to present new data on some Middle Paleolithic open-air sites located in lakeshores and riverbanks in Eastern Germany. The results indicate that the settlements were of short-term occupations and that Neanderthals applied different strategies of production and artifacts exports off-site.

[389] *Chair*

Pickel, David (Stanford University)

[348] *Chair*

Pierce, Daniel (University of Missouri-Columbia)**[376] *The Obsidian Trail: A GIS Model for Obsidian Trade Routes in the West Mexican Aztatlán Tradition (AD 900–1350)***

The Postclassic Aztatlán Tradition of western Mexico is well-known for its expansive trade networks. Aztatlán merchants traded ceramics, shell, copper, and obsidian across vast distances. Obsidian provides us with a particularly unique opportunity to trace trade networks due to the compositional homogeneity of obsidian sources. Recent studies have identified the source of thousands of obsidian artifacts from numerous Aztatlán centers, allowing for an elaboration on themes such as access to exotic goods and socioeconomic relationships. The aim of this paper is to create a series of models of possible trade routes from seven Aztatlán centers to the most common obsidian sources identified in previous geochemical analyses. These routes have been established through a GIS least cost path using multiple cost surfaces and Tobler's Hiker Function to estimate path distance accounting for variable walking speeds across differing terrain. Further variables used to estimate possible paths include land cover and various hydrological elements. Ultimately, separate models were created and compared that assume a preference for water and overland travel routes. The resulting models assess the possibility of convergence of trade routes to and from key obsidian sources and various Aztatlán centers and lend themselves to estimating relative import cost.

Pierce, Daniel [9] see Callaghan, Michael

Pierce, Karen (University of Colorado) and Elizabeth Graham (Institute of Archaeology, University College London)**[9] *Late to Terminal Classic Changes in Architecture and Caching Patterns at Structure N10-15 in the N10[3] Palace Group at Lamanai, Belize***

The Maya site of Lamanai in northern Belize exemplifies one of the longer occupation spans in the Maya Lowlands—continuously inhabited from the Preclassic (ca. 1500 BC) through the Spanish and British colonial periods (post-AD 1540). The N10[3] architectural group (Ottawa), located in the Central Precinct of Lamanai, has been interpreted as a palace group of significance due to its lengthy occupation span and its location adjacent to two important ceremonial plaza groups. During the Late to Terminal Classic period (AD 624–962 at Lamanai), the Ottawa Group underwent a major architectural transformation, which may be an indication of changing functions and strategies on the part of Lamanai elites. During the massive remodeling some masonry structures were razed and replaced with wood buildings while others, such as Structure N10-15, continued to be remodeled in masonry. Here the architectural sequence of Structure N10-15 is examined in conjunction with the caching patterns present throughout the different architectural stages. When considered together, the architectural changes at Structure N10-15 and associated changes in cache composition and

placement may signal a shift in emphasis away from exclusive elite-led activities associated with divine kingship toward those of a more inclusive and public nature.

Pierson, Arielle [125] see Baron, Joanne

Pigott, Vincent C. (University of Pennsylvania Museum)

[271] *Putting a "Human Face" on Prehistoric Mining/Metallurgical Communities in the Khao Wong Prachan Valley of Central Thailand*

In the context of prehistoric archaeology in Thailand, metallurgy has been accorded significant attention in the literature, ranging from the origins debate to smelting technology as well as the socioeconomic contexts of copper production. An important complementary component of these discussions is seeking an improved understanding of associated human occupations. In the Khao Wong Prachan Valley (KWPV) of central Thailand, a major regional copper production center, the Thailand Archaeometallurgy Project (TAP) has delved deeply in the nature of production processes at the sites of Non Pa Wai and Nil Kham Haeng. Over the past several years, TAP researchers have been making significant inroads into understanding issues including subsistence, bioarchaeology (human, faunal, and botanical), trade and exchange, site chronology, and the effects of copper smelting on human and environmental health. After a brief overview of TAP, this paper addresses several of these issues in the attempt to put a more "human face" on occupation at these two massive prehistoric copper production sites. This will serve as an introduction to a second paper that will present the results of a major new series of AMS dates from the KWPV, and their implications for Thai and Southeast Asian prehistory.

Pigott, Vincent C. [271] see Weiss, Andrew

Pike, Matthew [4] see Cooper, H. Kory

Pikirayi, Innocent, Federica Sulas (University of Pretoria), Tendai Treddah Musindo (Great Zimbabwe University) and Elton Munyaradzi Sagiya (National Museums and Monuments of Zimbabwe)

[20] *Great Zimbabwe's Water*

In southern Africa, Great Zimbabwe has long been the focus of research, debates and preservation as the remains of what was once the urban center of a vast state system. As new research findings are reframing the development of the Zimbabwe civilization in the region, local environmental settings and natural resources at Great Zimbabwe remain poorly understood. Using approaches in geoarchaeology, this paper presents Great Zimbabwe as a living landscape. New soil sequences from within and around the site reflect a complex history of water and soil management with indications of localized changes, rather than significant transformation over time. By placing Great Zimbabwe in its living landscape, we can access new sources of information for taking stock of the past and its legacies in the present for the benefits of both heritage and people.

Pilaar Birch, Suzanne (University of Georgia), Russell Graham (Pennsylvania State University), Eric Grimm (University of Minnesota), Jessica Blois (University of California, Merced) and Jack Williams (University of Wisconsin, Madison)

[227] *A New Stable Isotope Data Repository within the Neotoma Paleoecological Database*

The Neotoma Database (neotomadb.org) functions as an interdisciplinary, open-access, and community-curated database for paleoecologists. Primary data types include proxies such as pollen, vertebrate remains, diatoms, and plant macrofossils. Because stable isotope data carry essential paleoenvironmental information about hydrology, diet, foodweb, and other signals, the structure of Neotoma has been modified to accommodate isotope data, thus facilitating the integration of these data with other paleo data. To date, the key bottleneck to our understanding of variability across not only spatial but also long-term temporal scales is not lack of data but rather a lack of exchange. Neotoma serves as a hub for storing and accessing diverse types of data that enable the building of "big data" from the long tail of individual sites, and offers an unparalleled opportunity for visualizing the intersection of multiple strands for paleoecological reconstruction from the macroscopic to microscopic and biogeochemical scales. In addition to the launch and initial population of the stable isotope repository, issues that affect all so-called big-data efforts exist as challenges for the future, including establishing best practices and standardization in recording/reporting, monitoring data quality, linking datasets, and increasing accessibility while protecting sensitive information.

Pilaar Birch, Suzanne [223] see Rivera Araya, Maria Jose

Pilles, Peter

[84] *The Perkinsville Valley: The Fishes Enter the Uncharted Waters of the Upper Verde Valley*

In the 1960s, a group of students at Arizona State University organized a multiyear program of archaeological survey and excavations in the Perkinsville Valley, an archaeologically unknown region briefly visited by Jesse Walter Fewkes in 1906. Starting with a wide-ranging reconnaissance, a survey identified 21 sites, indicating a long-term occupation throughout the entire cultural sequence of the Verde Valley, from the Early Archaic through the terminal AD 1300–1400 periods. A number of sites were excavated, identifying multicultural occupations by people of the Hohokam, Prescott, and Southern Sinagua traditions. This work was documented in a series of student papers but only a few publications, but the provided a tantalizing glimpse of the importance of the Upper Verde Valley to the prehistory of central Arizona. This paper will summarize the results of Arizona State University's early work in the valley, and the significant contributions that Paul and Suzanne Fish have made to clarify the murky waters of Verde Valley prehistory.

Pillsbury, Joanne (Metropolitan Museum of Art)

[391] *Discussant*

Pillsbury, Joanne [164] see Boswell, Alicia

Pimentel, Gonzalo [134] see Vidal Montero, Estefania P.

Pimentel Nita, Roberto (University of Warsaw), Krzysztof Makowski (Pontifical Catholic University of Peru) and Milosz Giersz (University of Warsaw)

[170] Middle Horizon "Local" and "Exotic" Styles in Castillo de Huarmey and Pachacamac: Menzel's Ideas Revised

Recent excavations at Castillo de Huarmey and Pachacamac leave no doubt that the earliest archaeological contexts associated with Middle Horizon in both sites are related to the second half of that period and coincide with the collapse of two main regional political systems on the Peruvian coast: Moche and Lima, respectively. Both systems, consolidated and politically transformed, have overcome adverse climate conditions of the sixth and seventh centuries AD. In the case of Castillo de Huarmey and Pachacamac, the ceramics of different styles and from various epochs (according to Dorothy Menzel's terminology) are found within the same stratigraphic contexts. Our analyses show that styles, with "local" and "exotic" characteristics, both were locally produced. Style and technique diversity would be conceived as the result of the presence of workshops with craftsmen of native and foreign origins that could even be involved in the same artifact production. A complex political network capable of moving long-distance specialists and craftsmen, similar mutatis mutandis to the Inca Empire, had to be developed to make the changes described above possible.

Pimentel Nita, Roberto [316] see Druc, Isabelle

Piña Calva, Maribel (Dirección de Registro Público de Monumentos y Zonas Arqueológicas e Históricas.) and Pedro Francisco Sánchez Nava (Coordinación Nacional de Arqueología)**[328] El Registro de los Monumentos Arqueológicos como una Forma de Protección**

El registro de los monumentos arqueológicos, muebles e inmuebles, que de acuerdo con la legislación mexicana vigente, son patrimonio de la nación, implica, amén de un ejercicio académico, un instrumento legal de protección, en tanto que significa el reconocimiento de la existencia física de dichos bienes patrimoniales, a través de su inscripción en un Registro Público. Esta tarea, iniciada hace más de setenta y cinco años, está encomendada al Instituto Nacional de Antropología e Historia (INAH), a través del Registro Público de Monumentos y Zonas Arqueológicas, Históricas y Paleontológicas. En esta ponencia se busca destacar el marco jurídico en el que está inmersa esta tarea, la génesis del registro de los bienes arqueológicos, vinculada al propio desarrollo de nuestro instituto y, de manera preponderante, su importancia no sólo como herramienta de protección de esta forma de patrimonio, sino también como "piedra de toque" para el desarrollo de investigaciones. Finalmente, nos interesa hacer una reflexión sobre los retos que encara esta tarea de frente al siglo que corre y al contexto académico, social y económico en el que se circunscribe.

Pink, Jeremias (Oregon State University), Ronald K. Fauseit (Pierce College) and Carlos Rojas Ortiz (Universidad Veracruzana)**[7] Domestic Production and Use of Mold-Made Whistles and Figurines in Late Classic Oaxaca, Mexico**

Mold-made ceramic figurines and whistles are a common component of Late Classic assemblages in the Valley of Oaxaca, Mexico, yet little is known about their ceremonial significance or context of use. Our excavation of an elite residential complex at the site of Dainzú-Macuilxóchtli yielded nearly 5,000 fragments of these ritual objects, the majority from midden deposits associated with an open stone platform that likely served as a ceremonial space for the residents. A small ceramic kiln located adjacent to this platform and recovery of 30 figurine molds from the same deposits provide solid evidence that many of these objects were produced on-site by members of this household. These findings suggest that figurine production and use were an important part of elite domestic ritual and that these activities were not exclusive to ceremonies held in the civic-ceremonial core of the site. This is consistent with broader patterns of political and social reorganization during the Late Classic, which were manifest in part through a shift in ceremonial focus from public, communal ritual to more private activities emphasizing the importance of individual lineages of elites.

Pink, Jeremias [136] see Fauseit, Ronald

Pino, Mario [382] see Goodbred, Steven

Pintar, Elizabeth (Austin Comm. College) and Nora V. Franco (CONICET and University of Buenos Aires)**[232] Hunter-Gatherer Home Ranges in Arid Environments: Exploring Some of the Differences and Similarities**

Deserts have traditionally been considered marginal environments, because survival depends on several factors. Some researchers have pointed to the importance of water for hunter-gatherers living in these environments, as well as the increased knowledge of the environment they lived in, and its resources, as well as the awareness and knowledge of neighbors on whom to call in lean times or with whom to interact and exchange partners and the knowledge of resources. Here we present two cases from two South American cold deserts—Patagonia and Puna, located at distances greater than 150 km from the coast and where evidence analyzed corresponds to the "effective human occupation" of the space, i.e., a moment when all desirable spaces were occupied, with the presence of neighbors. Aside from the difference in latitude, altitude varies between both deserts: Patagonia lies at lower elevations than the Puna. Within an ecological framework, we use raw material and plant provenance to evaluate home ranges, as well as the use of distant resources, including those of marine origin, to discuss interactions with groups located in other ecological regions. Reasons for similarities and differences found are analyzed and discussed.

Pintz, Kevin [368] see Mead, Kent

Piper, Philip [229] see Eusebio, Michelle

Pirlot, Marc [40] see Coppe, Justin

Piscitelli, Matthew (Field Museum)**[76] Reevaluating the Case for America's First Cities: Evidence from the Norte Chico Region of Peru**

The Late Archaic Period (3000–1800 BC) was a time of dramatic cultural transformations in the Central Andes. At the beginning of the third millennium BC, at least 30 large, sedentary agricultural settlements with monumental architecture appeared between the Huaura and Fortaleza river valleys in a region known locally as the "Norte Chico" ("Little North"). Given the quantity, size, and complexity of monumental architecture at these sites, as well as the unique settlement patterns, some have argued that the Norte Chico region was home to America's first cities. Despite over 20 years of research in the area, many basic questions remain concerning demographics, the built environment, and sociopolitical organization. This paper presents recent evidence from the Late Archaic sites of Huaricanga and Caballote. The precious development of the Norte Chico region during the Late Archaic Period challenges our current understanding of the development of social complexity, and these new data will inform models of settlement growth by providing insight from a unique cultural history not normally considered in discussions of urbanism.

[29] Chair

Pitblado, Bonnie (University of Oklahoma)**[150]** *Moderator***[109]** *Discussant*

Pitblado, Bonnie [394] see Dudley, Meghan

Pitcher, Tony [378] see Surma, Szymon

Pitezal, Todd [84] see Klokler, Daniela

Pittman, Lydia (New Mexico State University)**[104]** *A Comparison of Miniature Pottery Vessels from the Reserve and Mimbres Branches of the Mogollon of Southwestern New Mexico*

This study will compare the attributes of Miniature Pottery Vessels in the Mimbres and Reserve Branches of the Mogollon Cultural Area. I will focus on their types, forms, decorative elements, traces of use, and depositional context. The vessels will be no more than 10 cm (4") or less in any dimension. This long-term comparison compares the similarities and differences of the vessel's characteristics in the two regions in the years between AD 450 and 1450. This study may yield important data about interactions over time between the two important regions. I hypothesize that the social structure and regional interaction changed during over time. Further, this study may also show if and how populations moved, especially in the post-AD 1150 period. Did this late period with changes in environment and cultural reorganization, that included new religious movements, change or enhance the uses of these vessels?

Planella, María Teresa [388] see López, María Laura

Plank, Shannon [329] see Kidder, Barry

Platt, Sarah (Syracuse University)**[159]** *Modern Floods, Historic Fires, and Unstable Urban Landscapes in Charleston, South Carolina*

The city of Charleston, South Carolina is situated on a peninsula in a naturally marshy environment threaded with tidal creeks. Since European settlers first began to develop the city in the late seventeenth century, these wet, low-lying areas were drained and filled in to accommodate expansion of the southern metropolis and combat disease. The result is a landscape, both in shape and relief, that has changed dramatically from one generation to the next. Fires, the threat of war, hurricanes, and slave rebellions all contributed to the making and remaking of this urban environment. Captured both in a carefully researched map constructed by Alfred Halsey in the 1950s and represented by a digital Geographic Information System (GIS) generated by the author, this paper argues for a landscape in constant flux that profoundly affects each generation's relationship to the city around them. In light of recent construction projects on the peninsula destroying below-ground heritage despite robust protections for the built landscape on the surface, this raises important questions regarding archaeological interpretation of these complex urban sites and how those interpretations could be and are represented to the public.

[159] *Chair*

Platz, Lorelei [156] see Dennett, Carrie

Playford, Tomasin [122] see Riehl-Fitzsimmons, Belinda

Plekhev, Daniel [260] see Weitzel, Elic

Plesic, Carly [259] see Cannon, Danielle

Plint, Tessa (University of Western Ontario), Lisa Hodgetts (University of Western Ontario) and Fred Longstaffe (University of Western Ontario)**[191]** *The Effects of Different Defleshing Practices on $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ of Modern Faunal Bulk Bone Collagen*

Stable isotope values obtained from modern faunal skeletal material often provide important comparative data in zooarchaeological investigations of past food-web dynamics and human-animal interactions. Unlike archaeological material, modern faunal material requires additional time-consuming preparatory work prior to analysis (i.e., defleshing). Cooking and the application of proteolytic enzyme are quick and effective methods, but it is unclear if these techniques alter original bone collagen isotopic composition. This study explored the impact of four different defleshing methods on the $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ of modern mammalian bulk bone collagen. Mandibles from *Castor canadensis* carcasses ($n = 4$) were divided into four, and each subsample was subjected to a different defleshing treatment (manual defleshing; soaking in room temperature water; boiling; soaking in water-Protease solution). Three individuals demonstrated negligible (within the range of measurement error) $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ variation ($\pm 0.1\text{‰}$, 1SD) among subsamples subjected to different defleshing methods. One individual demonstrated small, but significant variation in subsample $\delta^{13}\text{C}$ ($\pm 0.2\text{‰}$) and $\delta^{15}\text{N}$ ($\pm 1.1\text{‰}$) among defleshing methods. This variability is probably linked to method efficacy and remnant soft tissues contaminating the collagen sample. Overall, this work is a promising initial step toward reducing preparatory time of modern faunal material intended for stable isotopic analysis.

Plog, Stephen [130] see Watson, Adam

Pluckhahn, Thomas (University South Florida) and Neill Wallis (University of South Florida)

[278] *Households and Hopewellian Interaction in the American Southeast*

The Middle Woodland period in the American Southeast was marked by a florescence of interaction, evidenced most prominently by Hopewellian exchange of exotic, symbolically-charged artifacts of stone, bone, shell, and minerals. The focus on exotic artifacts and their mortuary contexts has created a myopia toward exchange among elites, be they conceived as chiefs or religious specialists. However, recent work suggests that the exchange of exotics may have been secondary to more common exchange among households, including both utilitarian and craft goods, over both short and long distances. Household exchange may thus have provided the context for elite exchange, rather than the other way around.

Pluckhahn, Thomas [163] see Thompson, Victor

Plumer, Hannah [8] see Winstead, Seth

Plumer, Hannah [276] see Quiroz, Carlos

Pluta, Paul (University of Florida)**[233] *Cultural Responses to Climate Changes in Preceramic Coastal Peru***

Research at the archaeological site of Yara in southern coastal Peru has revealed at least three separate levels of human occupation in sequence with several large debris flow deposits. In this extremely arid environment these debris flows represent strong El Niño events that were potentially catastrophic to the inhabitants of the region. Evidence for the repeated occupation of the landscape in the face of these episodic hardships provides a window into human responses to the changing mid-Holocene climate, a period of instability in El Niño's frequency and intensity. Ongoing research at the site has the potential to yield a wealth of information on the lives of early fisherfolk living along the Pacific coast of South America, as well as past changes in El Niño behavior.

Pnewski, Joseph (University of Minnesota)**[189] *An Abundance of Data: The Opportunities and Constraints of Digital Media Utilization at Fort Snelling National Historic Landmark***

Intensively recorded, researched, and utilized historic and archaeological sites present many unique opportunities and issues in their study and interpretation. One such site is Fort Snelling National Historic Landmark. The large amounts of historic map and archival data available throughout the history of Fort Snelling allows for both more complete, and more complex understandings of the site. The use of georeferenced archival maps can highlight and visualize a timeline for the progression of changes from historic events and modern development including the locations, relevant dates, and utilization periods for potential archaeological sites such as demolished buildings and former use areas. In addition, georeferencing of previous excavation maps allow for the attachment of artifact catalogs, field notes, and photos to individual excavation units and areas, showing larger patterns in archaeological distribution and composition. In contrast, a large abundance of data can also prove to be a hindrance through conflicting datasets, differing locational data, and difficult access to forms of information. This paper will examine the contributions and constraints of digital media in the identification of potential future archaeological investigations, its use in the interpretation of artifact assemblage distribution, and how that information is accessible for Fort Snelling National Historic Landmark.

Pober, Rachel (Desert Research Institute), Amanda Keen-Zebert (Desert Research Institute) and Loren Davis (Oregon State University)**[191] *Refinement of the Chronostratigraphy and Age of Pit Features at the Cooper's Ferry Site, Idaho***

The Cooper's Ferry site, which is located on an alluvial terrace at the confluence of Rock Creek and the Salmon River in Idaho, contains a stratified sequence of Western Stemmed Tradition archaeological components within alluvial and aeolian sediments. Excavations have revealed large quantities of lithic artifacts and numerous cultural features, including several storage pits. Recent excavations have encountered artifacts and faunal materials from intact deposits located beneath the late Pleistocene-aged Rock Creek paleosol. Because these lower deposits have not produced enough datable organic materials, we will be using single grain optically stimulated luminescence (OSL) to establish a chronostratigraphic framework for the site's earliest archaeological components. OSL dating will also be used to evaluate the timing of a single cultural pit feature's construction and use, in order to evaluate whether it contains multiple episodes of superimposed pit construction. We expect that OSL dating of sediment within the pit will establish the age of pit usage and that the feature post-dates the surrounding sediments, confirming that it is a pit. We also expect that OSL equivalent dose (De) distributions in alluvial sediments will be less scattered than the sediment within the pit, which we expect to have widely scattered De distributions.

Pobiner, Briana (NMNH, Smithsonian Institution)**[305] *Early Stone Age Hominin Habitat Preferences: Predictions from a Modern Taphonomic and Ecological Study in Kenya***

Two key resources that would have conditioned hominin behavior and habitat preferences in the Early Stone Age of Africa are food and water. This talk presents an examination of spatial relationships of these resources from a modern taphonomic and ecological study of large mammal carcasses at Ol Pejeta Conservancy, Kenya. The locations of fresh carnivore kills and older bone scatters that still retained within-bone nutrients (marrow and brains) are examined to determine whether these dietary resources are clustered or randomly distributed across the landscape, which habitat types they are most often found within, and how closely associated they are with fresh water. Based on these results, I will offer some ideas regarding hominin habitat preferences during the Early Stone Age—a time of increasing evidence for procurement of food resources from large mammal carcasses.

Pobiner, Briana [85] see Woolard, Katherine

Poblome, Jeroen [371] see Vandam, Ralf

Poh, Yi Jia Gabriela (Poh Yi Jia Gabriela)**[33] *A Preliminary Discussion on the Migration of Early Xianbei and Their Subsistence Adaptations***

The Xianbei tribe, prior to establishing their political regime, embarked on a journey of migration from the now-Northeast China to the "Central Plain"; and archaeologically, we observe their burials en route. Past studies focused on identifying the Xianbei from other tribes, but in the era of ethnic fusion, the in-congruence of burial goods with ethnic identity poses a range of complexities. This paper shifts focus to look at the Xianbei from an economic perspective to depict the social development that was previously underestimated. Unlike its politically-inclined development in later pre-regime stages, early Xianbei present a case of their adaptation to the external environment. Referencing related studies that have been done for Neolithic China, this paper utilizes primarily quantitative methods to analyze the burial goods of Xianbei tombs—production tools, ornaments, birch bark containers among

others—and seeks to outline this economic shift in subsistence structure. A further comparison between tombs of three different sub-tribes—the Tuoba Xianbei, Tanshihuai Xianbei and Eastern Xianbei also reveal varying degrees of adaptability among them. Unlike Tanshihuai Xianbei's unsustainable military exploits or Eastern Xianbei's inactive migration efforts, this paper argues that Tuoba Xianbei's eventual political success is linked to economic foundations laid via a steady, adaptive migration process.

Poinar, Hendrik (McMaster University)

[22] *Benefits of Time Travel: The McMaster Ancient DNA Centre*

Our laboratory focuses on the preservation and degradation of organic signatures in archaeological remains. We devise and use state-of-the art genetic techniques to pull DNA sequences from tooth and bone remains to address questions of ancestry, origins, extinctions, and evolution. Currently the lab is focusing on the evolution of infectious disease, namely plague, using full genomic evidence garnered from victims of past pandemics. I will speak about the center, the overarching questions we are trying to address and the training graduate students can expect to receive during their MA and/or PhD work.

Poinar, Hendrik [144] see Harris, Alison J T

Point, Wayne [17] see Finkelstein, Aviva

Pokines, James (Office of the Chief Medical Examiner, Boston), April Nowell (University of Victoria) and Christopher Ames (University of Victoria)

[121] *Faunal Remains from Recent Excavations at Shishan Marsh 1 (SM1), a Lower Paleolithic Open-Air Site in the Azraq Wetlands, Jordan*
Excavations from 2013–2015 at the open-air site of Shishan Marsh 1 (SM1) located along the former wetlands shoreline in the Azraq Basin of eastern Jordan have yielded substantial Middle Pleistocene lithic assemblages in association with faunal remains. Skeletal preservation is poor, favoring the representation of megafaunal species and more robust elements. Multiple megafaunal taxa have been identified, including *Gazella* sp. (antelope), *Bos* cf. *primigenius* (wild cattle), *Camelus* sp. (wild camel), *Equus* spp. (two species of equid), cf. *Stephanorhinus hemitoechus* (steppe rhinoceros), *Elephas* sp. (extinct elephant), cf. *Panthera leo* (lion), and an additional large carnivore. The largely steppe-dwelling taxa were drawn to the relatively lush oasis environment, where they may have become the prey of the carnivores represented and the extant hominin groups exploiting these and other wetland resources. Blood residues from multiple taxa (horse, rhinoceros, bovine, camel, and duck) have been recovered from lithics displaying use wear, providing direct evidence of exploitation of the represented faunal species plus waterfowl by hominins.

Pokines, James [121] see Nowell, April

Pokotylo, David (University of British Columbia) and Hend Mohammed (University of Minia)

[43] *Public Opinion and Archaeological Heritage: An Initial Perspective from Egypt*

A recent survey of Egyptian public opinion on archaeological heritage issues focused on four main areas: level of public interest and participation in archaeology, the role of antiquities and monuments in contemporary society, perceived reasons behind the spread of the illicit antiquities trade, awareness of problems and issues that endanger Egyptian antiquities and monuments. Data collected from a sample of 908 residents across nine governorates in Egypt are used to examine trends and patterns in these areas. Respondents' education, age, and gender examined as factors affecting opinion.

[43] *Chair*

Poli, Andrea [85] see Redding, Richard

Politis, Gustavo (INCUAPA-CONICET, Argentina)

[226] *Late Pleistocene Archaeology in Argentina 47 Years Later*

In the 1970s Ruth Gruhn and Alan Bryan spent several weeks in Argentina as part of a one-year trip around South America. In those years, Ruth and Alan started to challenge the Clovis-First Model for the peopling of the America, and their visit to South America was instrumental in consolidating their ideas as well as stimulating the research of Late Pleistocene archaeological sites. Subsequent travels to the region, especially the one made by Alan in 1980, contributed to generating the hypothesis that there were people in the Southern Cone before Clovis and promoted the investigation of local archaeologists. While both had the pioneering attitude of supporting Monte Verde, Alan was the first foreign archaeologist to visit Arroyo Seco 2 and La Moderna in the Pampas region. After more than 45 years since their inspirational visit, many things have changed in the archaeology of Argentina, and today several research teams are investigating the early peopling of the country in almost every region. In this paper I summarize the recent advances in the study of these early archaeological sites (ca. 14 to 12 cal kyr BP) and focus on the sites of the Pampas region.

Pollack, David (Kentucky Archaeological Survey) and A. Gwynn Henderson (Kentucky Archaeological Survey)

[396] *Fort Ancient (AD 1350–1450) Domestic Rituals of the Middle Ohio Valley*

In many parts of the world, the construction and maintenance of a domestic dwelling is often accompanied by rituals intended to bless the house, appease the ancestors, or please the spirit world. Within the Fort Ancient (AD 1000–1750) area of the middle Ohio River Valley, as evidenced at Fox Farm, a large Fort Ancient village in north-central Kentucky, such rituals may take the form of objects (pipes, shell or bone pendants, marginella shell beads, drilled deer toe bones [cup and pin game], projectile points, discoids, and ceramics) placed in the holes dug for exterior structural wall posts or interior roof support posts, and concentrations of animal bones (deer jaw mandibles or bear tibia) placed along the edge of a house basin. Other rituals are represented by sacred pole-pits that contain portions of ceramic vessels, animal bones, and plant remains deposited after the pole was removed but before the pit was sealed. In this paper, we examine the contextual association of these materials within houses at Fox Farm that were occupied during and after the Fort Ancient Transformation (AD 1375–1425) for how they may inform our understanding of Fort Ancient ritual life.

Pollard, Joshua [87] see Delefortrie, Samuël

Polo-Díaz, Ana [275] see Arranz Otaegui, Amaia

Poniedzielnik, Ally [263] see Peacock, Taylor

Pool, Christopher A. (University of Kentucky)

[320] *Charting Long-Term Social Stability in the Tres Zapotes Region: Theory, Method, and Settlement Patterns*

In 2014 we initiated the Recorrido Regional Arqueológico de Tres Zapotes (RRATZ) to implement the NSF-funded project, "Long-term Social Stability in the Tres Zapotes Region." The goal of this project was to better understand the resilience of a tropical lowland polity through a millennium of political, economic, and environmental challenges, to document the preconditions that gave rise to this Olmec and Epi-Olmec polity, and to document the transformations that occurred in the wake of its decline in an area of some 400 km² that encompasses montane, piedmont, alluvial, wetland, and aeolian environments. In this paper we offer a theoretical and methodological overview of the project, grounded in political-economic and landscape perspectives and combining traditional pedestrian survey with advanced remote sensing technologies, including lidar. Further, we present initial assessments of changing settlement patterns within the Tres Zapotes hinterland.

[148] *Discussant*

[320] *Chair*

Pool, Marilen and Christina Bisulca (Detroit Institute of Arts)

[104] *Archaeological Adhesives in the American Southwest*

The ancient cultures of the American Southwest used various plant and insect exudates as adhesives in a range of artifacts, including mosaic plaques, arrows, wooden tools, and in pottery as a repair and sealant. The conservation department at the Arizona State Museum surveyed the adhesives used in the Pottery and Archaeological Perishable Collections, analyzing over 100 objects that included every major cultural group in the Southwest sourced to 35 different archaeological sites. Identification was made with Fourier transform infrared spectroscopy (FTIR). The study revealed that pine resin and insect lac were the primary adhesives. Insect lac, a polyester exudate from insects (*Tachardiella* spp.) endemic to the desert lowlands, was the predominant adhesive used by the Hohokam. Both pine resin and insect lac were found in artifacts from the Mogollon and the Ancestral Pueblo. Most notable is the extensive use of insect lac by the Mogollon, as most of the artifacts analyzed were excavated from areas dominated by pine. Host plants for lac insects do not occur above ~5000 ft., which indicates trade of this material into the Mogollon Rim and Colorado Plateau. The results also potentially indicate preference for lac in certain applications, especially as a hafting material.

Pope, Carly

[370] *The Monagrillo Ceramic Complex of Panama in Subsistence and Social Contexts*

The Monagrillo ceramic complex has been identified at myriad archaeological sites around Parita Bay, Panama. These vary widely in geography from coastal, to inland, to riverine places. In these different environments, there is disparate and varied evidence of agriculture, indications of hierarchical social structures, and relationships with the creation of pottery at Panamanian sites. I theorize that maritime resources as opposed to cultivation formed the basis of these sedentary or semi-sedentary groups, which made and used Monagrillo pottery to meet specific social needs. Some have posited that ceramics were initially created to store or cook staple grains, but the evidence from Panama indicates that agriculture was either not practiced or not relied on at the time pottery first appears in the archaeological record. Instead, maritime resources likely formed the foundation of these economies, as evinced by their geographic positions and the abundance of shell and fish bones excavated in the strata containing this incipient pottery. Without an agricultural impetus to create pottery, another catalyst for its invention must have existed. The scale and decoration of these sherds indicate that this catalyst was likely social: the expression of group or individual identity, status in a hierarchical society, or ideology.

Pope, Melody

[264] *Exploring the Ineffable Aspects of Stone Tools*

Use-wear analysis provides precise functional attributes for materials and provides yet another source of data for archaeologists to use in classifying objects. People who used objects in the past knew them in other ways including what they did, when and how they were used, and by whom. In my presentation I propose that by combining use-wear, technological, and spatial evidence it is possible to approach more closely the complex correspondences that exist between materials and people. Insights gained in doing so raise questions as to the ineffable nature of materials, the archaeological practice of classifying things, and the complex relations that exist between people and things like sickle blades for harvesting plants, drills for making beads, and points for tipping arrows and lances.

Popova, Laura (Arizona State University)

[325] *Pastoral Categories for LandCover6K*

In this talk I will discuss the categories that will be used for the LandCover6K Project to track pastoral land use over time. These new categories will be discussed in terms of the more traditional categories archaeologist and historians have used to talk about pastoralism. I will give examples of how these new categories can be used to track pastoral land use in Eurasia using archaeological data.

Popper, Virginia (UMass Boston and MIT)

[27] *Cuisine of the Overseas Chinese in the Western United States: Using Recipes to Interpret Archaeological Plant Remains*

Most of the Chinese who immigrated to the United States in the mid- to late nineteenth century came from a few districts in southern China, an area with a well-developed cuisine. They brought ingredients, cooking equipment, dining implements, and seeds for garden crops to prepare food for daily meals and festivities. However, their culinary traditions were modified by a variety of factors including the absence of some ingredients, the easy availability of Euro-American foods, and restrictions on the immigration of women, which meant that in the United States men often became the cooks. Cooking Chinese dishes in remote mining and railroad construction camps was more challenging than in urban centers. This paper explores how cookbooks can help us interpret the dishes and meals represented by the plant remains from late nineteenth-century Chinese contexts in the western United States and how they document changes in traditional Chinese foodways.

Porcayo Michelini, Antonio [181] see Ainis, Amira F.

Porr, Martin [282] see Velliky, Elizabeth

Porter, Benjamin (University of California, Berkeley)
[70] *Discussant*

Porth, Erik, J. Lynn Funkhouser (University of Alabama), Susan Scott (University of Southern Mississippi) and John Blitz (University of Alabama)

[142] *Reconsidering Mississippian Communal Food Consumption: A Case for Feasting at Moundville*

Consuming food as a large group in a ritual context generates and reaffirms the social obligations of the participants and the sponsors of the ceremony. This paper evaluates models for feasting from the Mississippian center of Moundville, located in west-central Alabama. Feasting has not been documented in midden assemblages from the site because a wide range of ceramic vessel sizes and a diverse range of faunal species have been recovered. This indicated that the consumption of symbolic species and materials by influential individuals in a mound context was emphasized over communal aspects of social organization. This paper evaluates these models by synthesizing vessel morphological and functional analyses with faunal analysis from newly excavated mound midden assemblages dating from AD 1400–1550. Around AD 1450, the settlement pattern in the region shifted and certain ritual practices were emphasized as others fell out of favor, suggesting there was a change in social organization. This paper demonstrates that there was a greater range of mound-top food consumption activities occurring during this time than previously documented. This newly observed pattern of food consumption in a ritual context at a large ceremonial center has implications for the communal nature of social organization in prehistoric Southeastern societies.

Portillo, Marta (Department of Archaeology, University of Reading)

[275] *Human-Animal Interactions in Early Sedentary Societies in the Near East and Northern Africa: The MICROARCHAEOLOGY Project*

The MICROARCHAEOLOGY project aims to develop, standardize and integrate much-needed holistic interdisciplinary sampling protocols and analytical strategies for multi-proxy studies of livestock dung as an important archaeological material that is routinely overlooked or missed using conventional excavation procedures. MICROARCHAEOLOGY integrates state-of-the-art analytical techniques in geoarchaeology, bioarchaeology and biochemistry to enable a robust identification and interpretation of ancient dung remains, their content and context. The project aims to develop these methods firstly in examination of dung in experimental and ethnographical research to provide comparative analytical data-set on the characteristics, preservation and context of modern dung materials, dung-products and depositional contexts. To explore the potential contribution of dung studies for tracing human-animal interactions and the developments of early farming, a selection of archaeological contexts are included from a transect through the Near East, one of the key heartlands in which plants and animals that were later domesticated occur naturally, and from still under-investigated regions of North Africa, a potentially critical area with implications for surrounding regions including the Mediterranean and the Sahara. These case studies span the critical periods of transformation from ca. 10,000 cal BC to the last centuries BC to delineate human-animal interactions through time.

[275] *Chair*

Portman, Katherine [155] see Reese, Kelsey

Ports, Kyle [83] see Cortes-Rincon, Marisol

Posadas, Lylliam (Autry Museum of the American West)

[363] *Discussant*

Posth, Cosimo (Archaeogenetics Department, Max Planck Institute for Science of Human History), Thiseas Lamnidis (Archaeogenetics Department, Max Planck Institute f), Stephan Schiffels (Archaeogenetics Department, Max Planck Institute f), Kurt Rademaker (Archaeogenetics Department, Max Planck Institute) and Johannes Krause (Department of Anthropology, Northern Illinois Univ)

[143] *Andean Population Dynamics Revealed by Genome-Wide Data from the High Elevation Cuncacha Rockshelter*

Present-day Andean human populations harbor a relatively high genetic diversity but a minimal population structure and differentiation among them. Moreover, mitochondrial DNA (mtDNA) and Y chromosome studies on precontact human remains suggest that both modern and ancient Andean populations derive from a single ancestral origin. However, nuclear ancient DNA (aDNA) data from the Andes in particular and South America in general are still too scarce to fully address questions on genetic continuity through time. The employment of enrichment techniques in the aDNA field now provides the opportunity of targeting over a million autosomal variants and increases the resolution on past population dynamics. Here we analyze mtDNA and genome-wide data of five human burials from the Cuncacha rockshelter spanning between 9,000 and 4,000 years ago. Cuncacha is an archaeological site at 4,480 m above sea level in the southern Peruvian highlands, which exhibits human occupation from the Late Pleistocene onward. Tracking genomic changes at the same site over a temporal transect will provide insights on the demographic processes shaping Andean populations across the Holocene.

Pothier Bouchard, Genevieve (Université de Montréal), Michael Buckley (Manchester Institute of Biotechnology, University), Jamie Hodgkins (Department of Anthropology, University of Colorado), Susan M. Mentzer (Institute for Archaeological Sciences, Eberhard-Ka) and Julien Riel-Salvatore (Département d'Anthropologie, Université de Montréal)

[85] *New On-Site Method to Evaluate the Quantity and Quality of Collagen in Archaeological Faunal Assemblages Using a Portable FTIR and ZooMS*

Faunal remains play an important role in helping reconstruct Paleolithic hunter-gatherer subsistence and mobility strategies. However, differential bone preservation is an issue in southern European prehistoric sites, which often makes morphological identification impossible. Zooarchaeology by Mass Spectrometry (ZooMS) is a new, low-cost method that will improve NISP statistical significance in a replicable way by using diagnostic peptides of the dominant collagen protein as a fingerprint of animal (including hominin) species. It is also a powerful tool to assess collagen preservation for radiocarbon dating. We present a test of a method for evaluating collagen preservation in the field prior to ZooMS analysis. Using a portable Fourier Transform Infrared Spectrometer (FTIR) equipped with an attenuated total reflectance accessory, we evaluated the relative abundance of collagen and various components of the mineral fraction, in powdered bone fragments, as well as indicators of burning and fossilization. The bones were then analyzed by ZooMS and results compared to ascertain FTIR as a screening technique. This method was tested on assemblages from two Northwestern Italian sites: Riparo Bombrini and Arma Veirana. Both sites document the Middle-Upper Paleolithic transition with overlapping dates from distinct environmental contexts (coastal and mountainous hinterland) differing greatly in collagen preservation.

Potter, Ben A. [46] see Hilmer, Hilary

Potter, James (PaleoWest Archaeology)**[129]** *Feasting and the Ritual Mode of Production in the Mesa Verde Region of the American Southwest*

In the Southwest, feasting is understood as one of the primary mechanisms whereby small-scale agriculturalists of the past increased the social, demographic, and political scale of their societies. This study examines both artifact assemblages and communal architecture from a number of prehistoric sites in the Mesa Verde area. Consistent increases in the number and elaborateness of decorated serving bowls and the size of communal spaces suggest an increase in the frequency, intensity, and scale of ceremonial feasting from AD 600 to 1300. This trend tracks many of the expectations of Spielmann's Ritual Mode of Production model, wherein ceremonial feasting creates the demand that underwrites and sustains economic intensification in small-scale societies.

[129] *Chair*

Poulson, Simon (University of Nevada-Reno), Susan C. Kuzminsky (Instituto de Arqueología y Antropología-San Pedro), G. Richard Scott (Dept. Anthropology, University of Nevada-Reno) and Tiffany A. Tung (Dept. of Anthropology, Vanderbilt University)

[143] *Paleodiet in the Atacama Desert (Arica, Chile) and Andean Highlands (Ayacucho Basin, Peru) Using Stable Isotope Analyses of Dental Calculus*

Long-considered a nuisance, dental calculus has recently enjoyed attention as a potentially useful alternative biomaterial for a variety of anthropological applications, including stable isotope analysis as a technique to study paleodiet. Carbon and nitrogen stable isotopes of dental calculus have been measured for populations near Arica, Chile in the Atacama Desert (Archaic-Late Intermediate period), and post-Wari (Late Intermediate Period) populations from the Ayacucho Basin, Peru in the Andean Highlands. The Arica analyses are characterized by very heavy $\delta^{15}\text{N}$ compositions, from +17.8 to +33.1‰. These values can be explained, in part, by a diet with significant components of isotopically heavy marine resources and plants with $\delta^{15}\text{N}$ shifted toward heavy values due to the hyper-aridity of the Atacama Desert. The heaviest $\delta^{15}\text{N}$ values suggest the use of locally derived, isotopically heavy guano as a fertilizer during crop cultivation. The Ayacucho analyses show $\delta^{13}\text{C}$ values ranging up to -12.3‰, consistent with the use of C4 plants as a major component of diet. $\delta^{15}\text{N}$ values range up to +18.8‰, and as the site location likely precludes the use of marine resources, the heaviest values suggest the possibility of aridity-driven isotope enrichment and/or the use of camelid dung as a fertilizer during crop cultivation.

Pouncett, John [69] see Snoeck, Christophe

Power, Torin [11] see Stanyard, Zachary

Powis, Terry (Kennesaw State University), Jon Spenard (California State University, San Marcos), Adam King (University of South Carolina) and Nilesh Gaikwad (University of California, Davis)

[5] *A Toast to the Gods and Ancestors: The Role of Beverages in Classic Maya Elite Cave Ritual in West Central Belize*

For the past two decades, considerable archaeological attention in the Maya area has been paid to ritual cave practices and absorbed residue analysis of pottery, yet these two areas of research have not intersected. In this paper, we discuss the results of the kinds of liquid residues identified in monochrome and unslipped pottery vessels from caves around the site of Pacbitun in west central Belize, where extensive research in Classic Maya elite behavior has taken place. While we know the elite were performing religious rituals in these sacred landmarks, we do not have a full picture of the role of drinks/beverages used in these ceremonies. Epigraphic and iconographic analyses of polychrome pots have provided some information about ancient vessel contents, but this approach is not possible for vessels lacking hieroglyphic and/or pictorial evidence, as are those discussed in this paper. Our residue results bridge this gap, but more importantly, contribute to our understanding of specific elite subterranean activities. Through our research we are able to identify what type of liquids the vessels contained, and which ceramic types they are associated with. Importantly, we also compare these results to the Pacbitun site core for a better understanding of elite behavior there.

Powis, Terry [9] see Crow, Kaitlin

Powless, Patricia (Amec Foster Wheeler)**[276]** *The Challenges of Dealing with Multiple Sets of Human Remains in the Cultural Resource Management Setting where Tribal Resources Are Limited*

Over the past few years, I have had the opportunity to excavate a couple of large sites in California, working on behalf of a developer to keep their project in compliance with their permit. In conjunction, I also worked with the local tribe to resolve their burial issues with each excavation. During these two excavations, I have had to opportunity to observe the challenges that the tribe encountered when dealing with fast-paced cultural resource management (CRM) projects where burial retrieval and a shortage of resources was the norm. For many years, archaeologists have viewed CRM as just dealing with the material culture of the past; however, we also consult and work with the living culture. This paper will address the endemic problem in CRM of stems from a lack of planning, preparation, resources, and training and how it affects the burial excavations that we and tribes encounter in the CRM setting. It will also look for solutions to remedy a long-broken system that continues to ignore existing laws set in place to protect resources, as well as the relationships between the Native American community, agencies, researchers, and applicants.

Pozeilov, Yosi [392] see O'Neil, Megan E.

Pozza, Jacqueline (University of Wisconsin-Milwaukee)**[4]** *Cultivating Methods for New Conclusions: An Analysis of Oneota Copper Artifacts of the Lake Koshkonong Region in Southeastern Wisconsin*

Despite almost two centuries of North American prehistoric copper research, intensive archaeological investigations focusing specifically on Oneota copper are less abundant. Building upon previous studies, this project documented and analyzed over 500 Oneota copper artifacts in an effort to assess the production, utilization, and ideological and social significance of this copper materials. The artifacts of this study were recovered from four Oneota sites adjacent to Lake Koshkonong in Jefferson County, Wisconsin, dating to AD 1100 to 1400: Crabapple Point (47Je93), Schmeling (47Je833), Koshkonong Creek Village (47Je379), and Crescent Bay Hunt Club (47Je904). Methods for analyzing North American prehistoric copper artifacts are presented as well as the results of investigations in object form, damage, and general depositional context. For example, manufacturing marks and use wear observed on these objects provide arguments for multiple manufacturing traditions in the area and call into question previous assumptions about their technical utility. Additionally, the distribution of these artifacts and the iconographic symbols present among the collections suggest larger

ideological and social significance of copper within Oneota groups. Overall, this research provides possible standardized methods for future prehistoric copper studies and hopes to inspire additional Oneota copper research.

Praet, Estelle (Estelle Praet ULB-MEARAP), Peter Eeckhout (ULB-CReA-Patrimoine), Milton Lujan Dávila (Ychsma Project) and Sylvie Byl (ULB-CReA-Patrimoine)

[358] *When Archaeology Meets History: Documenting the Conquest and Transition Period at Pachacamac, Peru*

Traditional accounts of the conquest of Peru are well-known and universally accepted: in 1535, Francisco Pizarro—who had arrived two years earlier—decided to create a new capital in the neighboring Rimac river valley, which would one day become the current city of Lima. In order to achieve this, Pizarro forcibly displaced all the contemporary inhabitants of Pachacamac, leaving this major Inka pilgrimage site completely abandoned. However, new finds recovered during the 2016 excavations at Pachacamac are raising questions about this traditional view. Several pages of Spanish text written on parchment pages, dating to the sixteenth century AD, have been discovered. The pages were found in caches in building B4, and had been deliberately torn up. It clearly indicates a hitherto unrecognized continuity of occupation and building construction at Pachacamac in the early sixteenth century. A horseshoe along with horse and donkey bones were also unearthed in the same building. In this paper we discuss the original occupation and use of B4, as well as its transformation in early Colonial times.

[358] *Chair*

Pratt, Heather [47] see McMillan, Rhy

Pratt, William (Texas State University)

[220] *Form Is Emptiness, Emptiness Is Form: Reimagining the Pyramids at Cochasquí, Ecuador*

The archaeological site of Cochasquí, located north of Quito in the Ecuadorian highlands, has long been defined by its massive quadrangular pyramids with extended entry ramps. When Max Uhle arrived on site in 1932 he focused his excavations on the largest of the 15 known pyramids. Uhle's work laid the foundations for the interpretations and the chronology of the site, which are still applied today. Archaeologist Udo Oberem conducted the most extensive excavations on site between 1964 and 1965, dating the occupation of the site from AD 950 to 1500. Oberem's publications over his work have been considered the authoritative source on the composition of the pyramids at Cochasquí. Until recently, no excavations or reinterpretations of the site had taken place since the time of Oberem. In 2016, the Proyecto Arqueológico Cochasquí-Mojanda was created to place the archaeological site within a regional context and reexamine the deep-rooted conceptions of the site. While the pyramids are often thought of as being constructed in a uniform architectural style, recent analysis has indicated evidence of differing forms, construction techniques, and cultural associations which may hint at the intended function of the site's most dominating and well-known structures.

Premo, Luke (Department of Anthropology, Washington State University)

[38] *Effective Population Size and the Effects of Demography on Cultural Diversity and Technological Complexity*

The "demographic hypothesis" provides a recent example of how models can play an important role in driving new and interesting archaeological research. Influential models by Shennan and Henrich inspired the notion that, holding all else constant, members of larger populations ought to display more diverse and more complex tool kits than those in smaller populations. Empirical tests of this idea against the material culture of recent small-scale societies have yielded mixed results, raising valid concerns about the efficacy of the demographic hypothesis for explaining changes in technological complexity during the Paleolithic. Here I address whether the mixed results reflect deficiencies with the formal models or with the expectations archaeologists derived in order to apply them to ethnographic data. I use simulation to show that Shennan's and Henrich's models highlight different demographic effects, each of which applies to a different set of conditions. The concept of effective population size is central to understanding this distinction. In light of my findings, I argue that one way to increase the power of empirical tests of the demographic hypothesis is to hew them more closely to the conditions of the formal models that inspired the demographic hypothesis in the first place.

Premo, Luke [38] see Lin, Sam

Prendergast, Mary [32] see Boivin, Nicole

Prentiss, Anna Marie (University of Montana)

[50] *Housepit 54 at Bridge River: Seventeen Anthropogenic Floors in Time and Space*

The Bridge River Archaeological Project initiated excavations of Housepit 54 in 2012 with the goal of developing an understanding of household history during the period of ca. 1,000–1,500 years ago. Excavations at Housepit 54 have revealed a remarkable sequence of 17 anthropogenic floors, 16 of which predate 1,000 years ago and reflect periods of rapid growth and stability. The earliest three floors derive from small (estimated 4–6 m diameter) oval structures followed by a seven-floor sequence representing an approximately 6 by 10 m rectangular house form. The final six-floor sequence consists of a much larger (approximately 13 m in diameter) oval structure. Within the floor sequence is evidence for consistency in domestic activities but also some significant variation. Two floors appear to have been engaged in large-scale cooking events as might be associated with community feasting. The final floor sequence provides some evidence for change in social relationships that may have included some degree of wealth-based inequality. This poster introduces the ancient floors of Housepit 54, placing them in their temporal and spatial context.

[278] *Discussant*

[50] *Chair*

Prentiss, Anna Marie [50] see Scott, Lindsay

Preucel, Robert (Haffenreffer Museum, Brown University)

[34] *Chair*

Preucel, Robert [34] see Duwe, Samuel

Prevedorou, Eleanna (Arizona State University and Wiener Lab ASCSA) and Jane E. Buikstra (Arizona State University)

[276] Curation of Human Skeletal Remains and Bioarchaeological Practice in Greek Context

Human skeletal remains constitute perhaps the most sensitive archaeological material, both biologically and socioculturally. Their recovery, preservation, curation, storage, and analysis are complex issues that need to be addressed within any given biocultural context. Given the country's geography and the long history of human occupation, Greek field archaeology is intense and ongoing, as part of either rescue excavations or academic research projects. Graves, cemeteries, and human skeletal remains are, thus, a frequent occurrence in excavations throughout Greece, resulting in the accumulation of osteological material. Aspects like insufficient time, funding, and documentation in the field, lack of appropriate containers and storage space, as well as the time gap between excavation and analysis become a common challenge. Here, we give an overview of excavation, preservation, conservation, and curation processes and we discuss bioarchaeological practice within a Greek archaeological framework. We then focus upon the newly launched project on the extensive Phaleron cemetery in Athens, in order to present examples and methodological approaches. Finally, we consider the role of collaborative projects and nonprofit institutions, such as the Wiener Laboratory of the American School of Classical Studies at Athens, in advising, managing large-scale bioarchaeological assemblages, and serving long-term preservation goals in Greece.

Price, Max (Harvard University)**[244] Animal Husbandry at Late Chalcolithic Tell Surezha (Iraqi Kurdistan)**

The Late Chalcolithic (fourth millennium BC) in northern Mesopotamia was a period defined by an increase in social complexity and inequality. The Oriental Institute of the University of Chicago's excavations at the site of Tell Surezha on the Erbil Plain in Iraqi Kurdistan have brought to light new information regarding the settlement of the region during this crucial period. This region is not well understood, especially when compared to adjacent regions, such as SE Anatolia and the Jezireh. Moreover, there is virtually no prehistoric faunal data from sites on the Erbil Plain. In this paper, I present new data from Tell Surezha collected during the 2013 and 2016 excavation seasons. I focus on the management of animals during the transition to complex society in the early-mid-fourth millennium BC.

Price, Michael (Penn State Anthropology), Rebecca Bliege Bird (Penn State Anthropology) and Douglas Bird (Penn State Anthropology)**[302] Assessing Hunter-Gatherer Mobility in Australia's Western Desert Using Historic Aerial Imagery from the 1950s**

Access to water, food, and other resources is a critical factor structuring hunter-gatherer mobility, but few landscape-level studies have examined how resource availability influences where foragers go and how long they remain at one place before moving on. Using a newly available set of aerial images from the Western Desert of Australia taken in 1953, we utilize a simple ideal-free distribution model to reconstruct forager mobility by the fire footprints they leave behind. We examine three predictors of forager mobility and population density as measured by the density and dispersion of recent fires: 1) water availability, 2) habitat diversity (access to two or more high-ranking ecological habitats), and 3) seral diversity (higher prior use by human hunters). If foragers are attracted to high quality patches, there are substantial implications for understanding the spatially heterogeneous nature of forager-landscape interactions as mediated through fire. This, in turn, has broad implications for understanding and interpreting land use and population movements from initial colonization of the continent to the present.

Price, Neil (University of Uppsala)**[15] The Viking Phenomenon**

In December 2015, the Swedish Research Council made an unprecedented investment in archaeology with a 10-year, multimillion dollar grant to establish a center of excellence in Viking Studies at Uppsala University. Much of the recent research into the Vikings and their time (c. 750–1050 CE) has focused on the complex processes of state formation and Christian conversion that eventually gave rise to the modern Scandinavian nations. Far less attention has been devoted to the very beginnings of this trajectory: who really were the Viking raiders in a specific sense, why did they do what they do, what kind of societies produced them, and why did they start to expand so violently at precisely this time? The answers to these questions concern the very origins of the Viking phenomenon, and our focus is thus on the critical period 750–850 CE and the decades either side. This paper introduces the project and its archaeological range: issues central to our understanding of how Scandinavia came to be what it is today, and the sometimes problematic ways in which this knowledge of the Viking-Age past is received in contemporary society.

[15] Chair

Price, Neil [15] see Collard, Mark

Price, T. Douglas (University of Wisconsin-Madison) and Shintaro Suzuki (Universidad del Valle de Guatemala)**[101] New Isotope Data from Classic Maya Copan**

Strontium, oxygen, and carbon isotopes are measured in human tooth enamel from 66 burials in the Late Classic (ca. AD 600–750) Núñez Chinchilla residential group at. Approximately 50% of the individuals are identified as nonlocal based on strontium and oxygen isotope ratios. They came from a variety of places in the Maya area. Comparison with an Early Classic burial group suggests substantial changes took place in the origins of migrants with more individuals coming from the east later in time. These results are compared with other data from Copan, with baseline measurements from the surrounding region including new data from Central America, and with the Maya area in general. More than 150 individuals from Copan have now been isotopically measured and these data provide a detailed picture of human movement at Copan and in the Maya region more generally.

[284] Discussant**[101] Chair**

Prieto, Gabriel [222] see Bardolph, Dana

Prijatelj, Agni (Durham University, United Kingdom)**[68] White Bones in Black Caves: Cave Burials and Social Memory**

Caves have always been part of contemporary, living landscapes: as such, they have acted not only as natural, cultural, social, economic, and ritual places, but also as political locales. One of the most recent, and contested, examples of this phenomenon in Slovenia is the use of karstic shafts as sites of post-war executions between May 1945 and January 1946, in the aftermath of the Second World War. Such sites of mass executions are used as a starting point of this paper in exploring the tensions between cave burials and social memory. More specifically, particular caves are examined in relation to local knowledge, identity, storytelling and the tensions between public remembering and forgetting. The findings of the historical and ethnographic research are then used to reflect on selected examples of historic and prehistoric cave burials, their relation to place-power, local identity, and social memory, with the aim to demonstrate the need to rethink many of traditional archaeological interpretations.

Primeau, Kristy E. [192] see Witt, David

Prince, Paul (MacEwan University)**[319]** *The Beaver of Children and the Poor: The Social Dimension of Fur-Bearing Mammal Exploitation in Central British Columbia*

The intensive Historic Period exploitation of beaver and other fur-bearing mammals, especially those that are small bodied, has typically been seen as a fur trade phenomena that can be explained in terms of optimizing returns of both material capital and prestige represented by European goods through the use of more efficient technologies introduced by Europeans. If this were strictly the case, we might expect to find a greater representation of the remains of beaver and small fur-bearers in Historic Period Indigenous archaeological sites than we do in Prehistoric contexts, but such comparisons are rarely undertaken. An analysis of faunal assemblages from contexts spanning the last millennium on the Nechako Plateau of central British Columbia is presented here and demonstrates that beaver and other fur-bearers were a ubiquitous part of people's prey choices. I argue that, in the long term, the place of these animals in the diet and culture of the area is better explained in terms of their potential social values than as strictly a matter of economic optimization.

Prince-Buitenhuis, Julia (University of Notre Dame)**[300]** *Dietary Ethnogenesis? An Examination of Dietary Patterns at the Santa Clara Valley Medical Center Potter's Field, California*

Previous research into nineteenth-century dietary variation within the United States has found significant variation based on social class, ancestry, and region. However, research to date has not systematically examined the specific social, cultural, and economic factors that contribute to dietary variation found throughout the United States during the nineteenth century. This study examines stable isotopes of carbon, nitrogen, and oxygen to examine the relationship between ethnic preferences, regional specialization, and socioeconomic status and diet among individuals interred at the Santa Clara Valley Medical Center potter's field (1870–circa 1935). The results demonstrate that local agricultural industry and low socioeconomic status play more important roles in explaining dietary patterns than ancestry or ethnic differences at the Santa Clara Valley Medical Center. Despite cultural preferences in food preparation, the ingredients regularly consumed are often isotopically similar. This factor likely explains some of the variation observed in diet across the nineteenth-century United States. Stable isotope analysis provides a useful tool for exploring the relationship between the development of agricultural industries and dietary patterns, and provides an avenue to research how socioeconomic status related to food choices in the nineteenth-century United States.

Prociuk, Nadya (University of Texas at Austin)**[379]** *Forging Identity: The Social and Symbolic Significance of Torques in the Iron Age Castro Culture*

The Iron Age Castro Culture of northwestern Iberia was steeped in the crosscurrents of disparate cultural influences. Linked to areas of temperate Europe by Atlantic trade routes, the Castro Culture was also subject to the encroachments of Mediterranean powers moving through the Iberian Peninsula. These diverse influences manifested in the Castro Culture in a variety of ways, including in methods of personal adornment. The gold and silver torques left by the Castro people are the best example of this blending of forces, used as symbols of power and prestige across much of Europe, made with techniques learned from Mediterranean cultures. In this paper I will explore the social and symbolic work enacted by these torques, including their potential roles in social negotiations, ritual performances, and the formation, maintenance, and negotiation of personal and corporate identity. Often crafted with virtuosic skill, these objects represent the interaction of individuals and groups with the forces that shaped the world of Iron Age Europe, and their attempts to navigate those forces while asserting meaning and identity on their own terms.

Proctor, Lucas [27] see Smith, Alexia

Proctor, Terren (Vanderbilt University) and Steven A. Wernke (Vanderbilt University)**[230]** *Mapping the Mines: Simulating Transit Routes between Mining Centers in the Colonial Andes with GIS*

Least cost path has been the method most commonly employed by archaeologists in attempts to determine routes from one site to another. This is due to the relative ease of use of this particular tool, as well as because of the parsimonious logic of this approach. The tool is also particularly useful where material remains of roads are no longer visible. However, the use of network analysis provides a more realistic possible route by taking into account known possible paths. Network analysis provides an alternative mode of simulating routes as it utilizes previously defined paths as the basis for its analysis. This method of route reconstruction is used less frequently, in large part in the face of insufficient data on probable paths. However, in many cases, data on ancient routes is available to archaeologists in the form of survey or technical reports. This study aims to compare the relative effectiveness of least cost path analysis and network analysis in extrapolating the most plausible route between Huancavelica and Potosí in the seventeenth century, using available data on the Qhapaq Ñan.

Prodanovich, Natalie [173] see Carmody, Stephen

Propst, Akacia (East Carolina University) and Megan Perry (East Carolina University)**[92]** *A Paleodemographic Study of Mortality in First-Century BC/AD Petra, Jordan*

The population of Petra, Jordan, from the first century BC to the first century AD appears to have rarely suffered from infectious diseases as suggested by the paleopathology profile of those buried on the site's North Ridge. However, many infectious diseases in the past killed their hosts before skeletal lesions could form so to be documented. Cemetery-level age-at-death profiles provide an important supplementary record of disease-related mortality risks faced by archaeological populations by distinguishing between catastrophic events, such as disease epidemics, versus normal attrition. Here, age-at-death estimates of 71 individuals in the sample were generated using cementochronology, which not only provides more accurate age estimates, but increases our sample size due to the fragmented and commingled nature of the Petra assemblage. A hazard model served to calculate risk of death by age in this sample to help identify forces resulting in the cemetery's creation. Petra's adult mortality profile based on the hazard model and the paleopathology data indicate that the cemetery was created through attritional processes rather than a catastrophic event.

Prout, Michael (Anthropology Master of Arts)**[11]** *Maya Child Sacrifice via Cranial Punctures*

Our knowledge of Maya human sacrifice is drawn from iconographic representations and contact period Spanish sources. Unfortunately, the corpus related to child sacrifice is extremely limited. In 1971 David M. Pendergast described the burial of a child from Eduardo Quiroz Cave with traumatic perimortem holes in the parietals. Later, Brady reported on a second child with similar wounds. Both Pendergast and Brady interpreted the evidence as reflecting child sacrifice. The recovery of thousands of human bones and bone fragments from Midnight Terror Cave in 2010 yielded evidence of similar perimortem trauma in the crania of at least one individual. This poster compares the contexts of the punctured skulls found in the human remains in

Eduardo Quiroz Cave, Naj Tunich, and Midnight Terror Cave to suggest this as a heretofore unrecognized method of Maya sacrifice, at least for children.

Prowse, Tracy [22] see Campeau, Kathryn

Prufer, Keith M. (University of New Mexico)

[162] *The Development and Resilience of Complex Polity in the Southern Maya Lowlands: A Decade of Research at Uxbenká, Toledo, Belize*
The original goals of Uxbenká Archaeological Project were to understand the geopolitical history of the polity in the context of wider regional developments during the Classic Period. Long suspected to be the earliest complex polity in southern Belize had intrigued archaeologists for decades based on its prominent locations between the Petén and the Caribbean Sea as well as its long history of descendant communities farming lands around the archaeological ruins. From 2008–2015 the Human Social Dynamics project greatly expanded our understanding the ecological context of human occupations in the region. These studies included detailed landscape histories of occupations throughout the Holocene, the development of extremely high-resolution climate proxies from nearby caves, and expanded archaeological research into the sociopolitical development and decline of the polity and its associated settlement system. Parallel to these studies, ethnographic and human-ecological research in the local community detailed linkages between past and present and developed integrated educational programs in cultural and environmental heritage for children and adults.

[162] *Chair*

Prufer, Keith M. [162] see Thompson, Amy

Pryor, Alexander (University of Southampton), Alistair Pike (University of Southampton), Jirí Svoboda (Masaryk University and Czech Academy of Sciences), Alexander Dudin (National Archaeology Museum in Kostenki, GBUK VO,) and Clive Gamble (University of Southampton)

[223] *Reconstructing Paleolithic Prey Migration Using Oxygen and Laser Ablation Strontium Isotope Measurements in Tooth Enamel*
This presentation reports isotopic data collected for an investigation of food storage behaviors at the European Gravettian sites of Dolní Věstonice-Pavlov (Czech Republic) and Late Glacial site of Kostenki 11 (Russian Federation) dated between 30,000 and 20,000 years ago. Our methods use strontium isotope (high-resolution measurements by laser ablation) and oxygen isotope analysis to investigate seasonal mobility of the main prey species: woolly mammoth, reindeer, horse, fox and wolf. The isotopic data reveal when animals were seasonally present near to the sites, when they were seasonally absent, and how predictable the animals were year-to-year with their movements. Data measured for woolly mammoth are particularly interesting as their teeth grow continuously throughout life and record up to ten years continuous mobility/climatic data per tooth. Results for each site show a clear pattern of habitual migration in mammoth and reindeer, while horses lived in single territories the whole year round. Additionally, in choosing where to locate their basecamps, humans do not appear to have targeted the migratory routes themselves but instead focused on the seasonal territories where fauna reliably spent several months each year. The talk will conclude by discussing the potential significance for Paleolithic food storage behaviors at 30,000 years ago.

Pryor, John

[366] *We Travel Together: A New Archaeology that Blends Western Science with Native American Perspectives and Values*
After 45 years of doing archaeology in both an academic and CRM context, I have come to the conclusion that archaeology as I have been practicing it simply no longer works for me. For the last 15 years my archaeology has been with and for Native Americans, and this collaboration has led me to many wonderful insights and has enriched the archaeology I have come to practice. This new approach is not a rejection of Western science but the blending of the best that we both have to offer. This new approach must be an equal partnership based on respect from both sides. To create this new archaeology will perhaps be a long journey, but one we must travel together—Native Americans and archaeologists.

Przadka-Giersz, Patrycja (University of Warsaw)

[316] *Ladies of Castillo de Huarmey: Women's Wealth and Power during the Wari Empire*
In recent decades, Andean archaeology has shown an increasing interest in studying women and the roles they played in ancient society. The spectacular discovery of the imperial mausoleum at Castillo de Huarmey represents the first undisturbed burial context of 58 noblewomen accompanied with six human sacrifices, two tomb guardians, and hundreds of precious artifacts, and provides groundbreaking data on female status in Wari Empire. The amount and the richness of the luxury and prestige items, which comprise over 1,300 objects of the most various kinds, provide important data regarding the identity of high-status women and their social and economic role in the Andean world in the past. Supplementary ethnohistorical sources of the wills of indigenous elite women of the early colonial period claim that both female attire and personal grave goods imitated the symbolic image of the queens and princesses of antiquity, who had a very similar role to that of the noble ladies buried in the mausoleum of Castillo de Huarmey.

Przystupa, Paulina (University of New Mexico)

[66] *Moderator*
[112] *Discussant*

Psimogiannou, Aikaterini (University of Illinois at Chicago, Anthropology Department)

[294] *The "Visible" Dead: Mortuary Patterns and Ceremonial Activities in the Dawn of the Bronze Age in Southern Greece*
Following anthropological theory regarding the dynamic relationship between the living and the dead, this paper will explore the role of mortuary and ceremonial places as important venues for human activities related to broader social phenomena and cultural changes. By the mid-third millennium BCE southern Greece had witnessed the emergence of social stratification evident both in the settlement and mortuary archaeological record. Little is known, however, regarding the preceding period and the processes that led to this inequality. Based on case studies from the end of the Neolithic and the beginning of the Bronze Age (mid-fifth–end of fourth millennium BCE) in southern Greece, this paper provides a preliminary study of mortuary analysis and radiocarbon dating of human burials. The end of the Neolithic period is characterized by a proliferation of burial remains, a variety of ceremonial activities, and the creation of the first extramural, organized cemeteries. Further investigation on this mortuary dataset could provide valuable insight on the emerging complexity evident in the later period.

Puckett, Neil (Texas A&M CSFA), Kelly Graf (Texas A&M CSFA) and Angela Gore (Texas A&M CSFA)

[332] *The Spatial Statistics of Owl Ridge: Identifying Activities and Camp Use*

The Owl Ridge site, located in central Alaska's Nenana Valley, is an excellent example of a stratified, three-component campsite. The three components span the late Pleistocene/early Holocene boundary with component 1 dating to 13,110–12,730 cal BP, component 2 dating to 12,580–11,310 cal BP, and component 3 dating to 11,400–10,710 cal BP. The presence of discretely dated and stratified components provides an ideal opportunity to identify local changes in land use, in the distribution of camp activity areas, and in the nature of camp activities over time. Statistical analyses including nearest neighbor, K-means clustering, and kernel density estimation were performed using ArcGIS. Tests were performed on each site component as well as within-component artifact types using both two- and three-dimensional views. The results demonstrate that there are distinct, statistically significant spatial arrangements of general artifact clusters and artifact clusters by type within each component. The spatial arrangement of artifact clusters differs by component illustrating site use change over time. When combined with previous spatial analyses focused on artifact raw material type, the spatial analysis at Owl Ridge reveals that humans were using the landscape and the site area in appreciably different ways during each period of occupation.

Pugh, Timothy (Queens College and The Graduate Center)

[179] *The Streets of Nixtun-Ch'ich', Guatemala*

Nixtun-Ch'ich' in Petén, Guatemala, was settled shortly before 1000 BC. Sometime between 800 and 500 BC, the settlement was reconfigured into a city with an urban grid—a form until now unknown in the Maya lowlands. As a geometric form, grids regiment a series of lines into a harmonious rhythm over a larger area. Urban grids are formed not by single-dimension lines, but by streets, which are public spaces containing traffic, communication, exchange, and social interaction. Thus, urban grids are not simply composed of buildings with matching orientations, but also of streets and avenues and the traffic they contain (form and content), which are coordinated and connected through a shared and legible geometric system of order. Thus, once imposed, a grid is no longer an abstraction, but the new landscape. They standardize space and make it easy to understand, organize, and use. In so doing, grids promote the intensification of internal social interaction as well as interactions with outsiders familiar with its uniformity. Yet, the convenience and legibility of urban grids also help rulers to manage and control a populace.

[67] *Discussant*

Pugh, Timothy [179] see Shiratori, Yuko

Pümpin, Christine [275] see Vrydaghs, Luc

Punzo, José Luis (Instituto Nacional de Antropología e Historia), Cesar Valentín Hernández (INAH), Lissandra Gonzalez (INAH) and Mijaely Castañón (INAH)

[135] *Ancient Metal Routs in the Tarascan Señorío: Mining, Smelting, Smiting*

At the Tarascan Señorío, all the metal work aspects were controlled by the uacúsecha (most important clan) leaders, from their central cities of Pátzcuaro, Ihuatzio and specially Tzintzuntzan by the Pátzcuaro Lake in central Michoacán. In this paper we present the different aspects of the metal work, and the control that the uacúsecha nobles imposed, expressed in the architecture and their most relevant adornments like metal earplugs and lip-plugs, from the mining sites in the Tierra Caliente, where are their most important mines, sites for smelting near by the mines, to another ones far away in key parts of the most relevant routs, sites far away from the mines for primary smelting and other ones where specialized artisans create unique metal items, consumed by uacúsecha nobility and all the caciques of the Tarascan territory.

Punzo, José Luis [386] see Campos, Cinthia M.

Punzo, José Luis [12] see Castañón, Mijaely

Punzo, José Luis [12] see Valdes, Alejandro

Purcell, Gabrielle (University of North Carolina at Chapel Hill) and Ashley Schubert (University of Michigan)

[160] *Archaeobotanical Analysis from the Cane River Site (31Yc91)*

In this paper, we present the results of archaeobotanical analysis from the Cane River Site in Yancey County, NC. Thirty-three samples were collected during the 2013–2014 field season from features associated with different spatial contexts such as household architecture and palisades. Our results show that corn, beans, and squash are ubiquitous in the assemblage, indicating that Cane River has unexpectedly high amounts of domesticates given its higher elevation and lack of lowland floodplains. In addition to the evidence for agricultural practices, wild plant foods such as mast seeds and acorns demonstrate that a broad variety of mountain resources were exploited. We will compare the thriving cultivation of domesticates and collection of a wide variety of wild plant resources at Cane River to other Mississippian botanical assemblages from adjacent South Appalachian sites to determine how it fits into a broader pattern of Mississippian food practices in the region.

Purchase-Manchester, Samantha [330] see Lieverse, Angela

Purdue, Louise [131] see Nondédéo, Philippe

Pursell, Corin and J. Grant Stauffer (Washington University)

[283] *Cahokia's Mound 34 and the Moorehead Moment*

Cahokia's Mound 34 was an essential component of the dramatic reorganization of the eastern portion of Cahokia's site core at the turn of the thirteenth century. Since the 1990s the Mound 34 Project has included examination of a copper workshop, the exploration of a complex mound construction history, and extended study of Mound 34's special role in the production and exchange of Southeastern Ceremonial Complex art. The construction of this mound and a series of other low platforms adjacent to the sunken Ramey Plaza permits the development of a novel ritualized public space in east Cahokia, as the occupants created and re-created an artificially leveled field and the second largest plaza of Cahokia's history. Our ongoing excavations have recently confirmed the southern margins of a large trench excavated into the mound in the 1950s, along the way confirming additional sub-mound structures connected to the Late Stirling/Early Moorehead (circa AD 1200) pre-mound surface adjacent to the developing Ramey Plaza, and portions of the architecture of a moundtop structure likely built early in the Moorehead phase.

Pursey, Lance (University of Birmingham)**[25]** *Who Were the Urban Liao? The Cultural Salience of "Urban" Life in a Mobile Society*

Recent insights into how urbanism and permanent settlements can function and be integrated into mobile societies has helped to overturn the notion that human societies 'progress' from mobile forms of production through irrigated agriculture to urbanism. Indeed the Liao Empire (907–1125 CE) of Northeast Asia shows how these three modalities can coexist and be interdependent. City and kiln sites, standing architecture and tombs are distributed extensively through the former Liao territory, and yet in a society that encompassed sedentary and mobile populations the cultural salience of being "urban" remains unexplored or presumed to be homologous to those of Tang (619–907) or Northern Song society (960–1125). This paper uses textual geographical data found in published epigraphical and biographical sources from the Liao period, combined with the spatial and archaeological context of Liao epigraphy to map the movements of Liao elites over the landscape, as well as political relationships within networks of the Liao administrative geography, with an aim to elucidate what it meant to be 'urban' in the Liao.

Purtzer, LeAnn [366] see Madsen, Alan

Pyburn, Anne (Indiana University)**[65]** *Discussant*

Pyburn, Anne [9] see Chiarulli, Beverly

Pye, Mary E. (New World Archaeological Foundation) and Gerardo Gutiérrez (University of Colorado-Boulder)**[306]** *Ritual Landscapes and Cave Networks of Eastern Guerrero, Mexico*

This paper presents an overview of the findings from the Formative period caves of Cauadzidziqui (pre-Olmec and Olmec-style paintings), Techan or Cave of the Governors (Olmec style monuments carved into the walls), and Ocotequila (Middle Formative painting), as well as Chiepetlan (Paleoindian, Late Postclassic-Early Colonial) and Cueva de las Lluvias (Classic period floor carvings). Also assessed is the importance of the locations chosen for Formative period caves in the sacred landscape of the region and the relationships to communication routes.

Pye, Mary E. [306] see Gutiérrez, Gerardo

Qin, Zhen (Washington University in St. Louis), Tristram Kidder (Washington University in St. Louis) and Haiwang Liu (Henan Provincial Institute of Cultural Relics and)**[325]** *An Interactive Scenario of Agricultural Intensification and Environmental Evolution: A Case Study at Sanyangzhuang Site*

Over the last 10,000 years, agriculture has gradually been intensified, and become the globally dominant way of subsistence. However, the relationships between agricultural intensification and environmental evolution are not fully clarified. Deeper understanding of the issue may be gained through research at Sanyangzhuang, a rural settlement site in present Henan Province in central China. Many agriculture features, such as ridge-and-furrow fields, have been recovered in three strata. Additionally, a complete history of the Yellow River floods has been recorded in the stratum around Sanyangzhuang site. All these features enable our further exploration of interactions between agricultural intensification and environmental evolution. By use of data from Sanyangzhuang site, this paper first examines two dynamic environmental factors as the potential driving force of agricultural intensification: the East Asia Monsoon determined paleoclimate and the alluvial process of the Yellow River. Then it explores the impact of agricultural intensification on the environment and landscape from a geoarchaeological perspective. By integrating these two lines of evidence, the interactive process of the agricultural intensification and the environment in the Central Plain, China from the late Neolithic to the early Iron Age is revealed.

Qu, Tongli (School of Archaeology and Museology, Peking University)**[78]** *Subsistence in the Late Pleistocene of China: A View from Laonainaimiao Site*

The paper presents the taphonomic and zooarchaeological analyses of the fauna from the Laonainaimiao site of Late Pleistocene in the central plain area of China. The taphonomy observation shows that the bones were accumulated by human activity. The taxa of the fossil assemblage is composed mainly of Equidae and Bos primigenius, followed by gazelle, deer, wild boar, rhinoceros, etc. Most carcasses of Equidae and Bos were likely to be transported to the site as a whole. The carcasses were intensively exploited for marrow and grease, probably due to the lack of fat during the harsh season. A prime-age dominated profile of the Equidae and Bos indicates the capability of hunting and the potential cooperative behavior. Laonainaimiao site adds important insight into the subsistence and culture in the middle Upper Pleistocene in China.

Qu, Yating, Yaowu Hu (Institute of Vertebrate Paleontology and Paleoanth) and Jianxin Cui (Northwest Institute of Historical Environment)**[117]** *Multiple Evidences for Variations in Subsistence Strategy of Prehistoric Humans from the Guanzhong Area in Shaanxi Province, China*

Influenced by the continual infiltration of surrounding cultures and the extension of agriculture originating in various independent centers, the multi-cultures and diversified economy had been formed in the Guanzhong area, Shaanxi, in the process of the prehistoric culture evolution. In this paper, the comprehensive analyses of stable isotopes (carbon and nitrogen) of humans and animals and the plant and faunal remains from the different periods and sites in the Guanzhong area will be employed to examine the evolving regularity and the influential factors of subsistence strategy of prehistoric humans. It will present compelling evidence to study the key topics on the agricultural origin and development, agricultural extension and dissemination, and the influence of cultural communication on agricultural development and agriculture responses to climate changes in the Holocene, north China.

Quackenbush, William (Ho-Chunk Nation)**[108]** *Discussant*

Quade, Jay [284] see Grimstead, Deanna

Quarato, Emily (University of Alabama) and Julia Giblin (Quinnipiac University)**[196]** *Burning Questions about Preservation: An Investigation of Cremated Bone Crystallinity in a Bronze Age Cemetery*

The elemental and isotopic analysis of human skeletal remains has greatly added to our understanding of diet, mobility, and social variability in prehistoric societies. For studies of this nature, it is critical to evaluate the preservation of the skeletal material prior to analysis to make sure that taphonomic processes have not affected the original chemical signatures. Calcined bone (usually produced from cremation burial practices) is generally avoided for chemical analysis due to heat induced chemical changes (e.g., isotope fractionation) and the porous structural properties of bone (as compared to tooth enamel). Recent work indicates that calcined bone may in fact retain "in vivo" chemical signatures for radiogenic isotopes due to increases in crystallinity that makes it more resistant to postdepositional diagenesis than unburned bone and teeth. In this study, Fourier Transform Infrared Spectroscopy (FTIR) is used to evaluate the crystallinity of cremated bone from a series of burials from the Békés 103 site, a Bronze Age cemetery from Eastern Hungary. This technique is used to investigate the crystalline and chemical structure of calcined and non-calcined bones within the cemetery. Our study will be used to determine which specimens could potentially be analyzed for strontium isotope composition in future work.

Quartermaine, Jamie [151] see Skinner, Jane

Quave, Kylie (Beloit College), Sarah Kennedy (University of Pittsburgh) and R. Alan Covey (University of Texas at Austin)

[331] *Status and Identity at the Margins of Empire: Foodways in Pre-Inka and Inka Cuzco*

Diet and cuisine are key practices in the daily negotiation of status and identity, particularly when studied at the household level. In the Maras region of rural Cuzco, the developing Inka state and a rival polity known ethnohistorically as the Ayarmaka maintained autonomous economic, social, and political practices. While other groups in the Cuzco region exchanged goods and shared some cultural practices with the Inka, the Ayarmakas did not. In the fifteenth century, the Ayarmaka suddenly abandoned the principal settlements in their homeland, and Inka rulers developed the Maras area into royal estate lands in the generations that followed, settling foreign retainer laborers there instead. Recent excavations at the largest sites in Maras during the pre-Inka and Inka periods provide a diachronic view of household economies at the margins of the growing Inka empire. Faunal analysis at both sites yields intrasite and intersite comparisons of social status and ethnic identity. We find greater distinctions among pre-Inka Maras contexts, and fewer in the Inka resettlement of retainers, based on the examination of taxa, species richness, camelid age-at-death and meat yields, and meat preparation techniques. This study reconstructs the local interactions of rival and subject populations in the imperial Andes.

Querré, Guirec (Laboratoire ArchéoSciences Rennes), Thomas Calligaro (C2RMF Paris France), Serge Cassen (Laboratoire de recherches archéologiques Nantes F) and Salvador Dominguez-Bella (Earth Sciences Department. Cádiz Spain)

[23] *Long Distance Provenances of Jewelry (Variscite and Turquoise) along Atlantic Europe during the Neolithic (Fifth–Third Millennium) Based on PIXE Analysis*

The exceptional quality of the green lithic adornments (jade axes, beads) deposited in the large grave mounds from Brittany, France, constitute the most impressive funeral architecture of the Neolithic period in Western Europe. The highest density of callais jewelry occurs in the Carnac region with over 800 green beads and pendants found in 33 Neolithic sites. A research program based on the chemical analysis of archaeological artifacts and geological samples from European deposits using the PIXE technique (particle induced X-ray emission) was conducted in order to determine their provenance. A chemometric model has been established from the acquired geochemical database. It allowed to conclude that 1) most artifacts were made of variscite, very few of turquoise; 2) all archaeological materials originated from the Iberian Peninsula; 3) from the half of fifth millennium until about 4000 BC, variscite was extracted from sources located in SW Spain (Encinasola, Huelva); 4) a procurement change occurred early in the fourth millennium, most variscite originating from NW Spain (Palazuelo, Zamora); 5) none of the Neolithic objects from Brittany were made of variscite from the well-known Mediterranean deposit (Gavà, Barcelona); and 6), during the Neolithic period, long-distance exchange of variscite-turquoise mostly developed along the Atlantic coast.

Querré, Guirec [23] see Cassen, Serge

Quilter, Jeffrey (Peabody Museum, Harvard University)

[382] *The Chicama Valley in Time and Space*

The Chicama is one of the largest valleys of the Peruvian coast, was part of the "heartland" of Moche culture, and a frontier between different cultural and linguistic regions at the time of Spanish arrival. This paper will review past and recent research in the valley and their problems and potentials. Particular attention will be paid to landscape archaeology and the history of irrigation systems and land use through time, themes to be addressed in the other papers of the session.

[64] *Moderator*

[331] *Discussant*

Quinn, Colin (University of Michigan), Alice Wright (Appalachian State University) and Benjamin Duvall-Irwin (Appalachian State University)

[4] *Toward a Deep History of Southern Appalachian Copper Mining: New Agendas and Approaches*

Copper was an important raw material throughout the prehistory of the Eastern Woodlands of North America. The role of southern Appalachian copper in social, economic, political, and ideological systems across the Eastern Woodlands has received little attention from anthropological archaeologists, particularly compared with copper from more famous procurement zones in the Great Lakes region. In this paper, we present the first steps of a new collaborative research project designed to understand the deep history of southern Appalachian copper extraction, production, and exchange. Building on a synthesis of geological information and historical records of copper mining in the southern Appalachians, this paper presents the context and background that informs research agendas and analytical approaches to the study of the origins and development of copper mining in the region. We argue that a holistic research approach that considers copper extraction at multiple temporal, spatial, and social scales is necessary to characterize how copper procurement was organized and changed throughout prehistory and to better understand the roles of copper in the lives of communities within and beyond the southern Appalachians.

[291] *Discussant*

Quinn, James [334] see Cipolla, Craig

Quintus, Seth (University of Hawaii at Manoa) and Jeffrey Clark (North Dakota State University)

[168] *Toward a Further Understanding of Samoan Star Mounds: Considering the Intersection of Ecology, Politics, and Ritual in Ancient Samoa*

Star mounds, named for their star-like shape, have been an enigmatic feature class in the Samoan Archipelago. Researchers have posited several potential functions for these monumental architectural features, including grave and territorial markers, but their primary function appears to have been as surfaces for pigeon catching. But, excavations of these features have been few and data limited. Here, we review old as well as recent data on star

mounds relating to their physical attributes (size, shape, and materials), distribution, and chronology to identify patterns of similarity and variability. In so doing, we provide a more robust understanding of their relationship to the landscape and their role in ancient Samoan society, notably politics and ritual. We argue that when placed within a ritually charged context, the "sport" of pigeon catching provided an avenue for the demonstration of mana and prestige. In Polynesia, such demonstrations were important for legitimizing and substantiating status, both individual and group (the higher the rank of the individual, the larger the group represented). Star mounds thereby served as arenas for status competition, potentially taking the place of warfare. The distribution and form of star mounds is the outcome of ecological reasoning, ritual logic, and political maneuvering.

Quiroz, Carlos (St. John's College/Maya Research Program), Katherine Miller Wolf (Indiana University East), Hannah Plumer (University of Sheffield) and Yasser Musa (St. John College)

[276] *When Provenience Is Lost: Achievements and Challenges in Conserving the Historical St. John's, Belize Skeletal Collection*

Funding in small developing countries like Belize for archaeological research and post excavation curation remains one of our greatest challenges to preserving our tangible cultural heritage. The state of curation of human remains and artifact collections at St. John's College in Belize City is a perfect example of what can go wrong when there is not established a properly funded and managed curation program both at the national level or the institutional level. This paper highlights the rediscovery of a historically significant group of human remains (n = 70+) in the biological collection of Friar Deickman that was forgotten in an attic after his death in 2003. We outline the process and accomplishments in improving the curation conditions of these individuals while uncovering their context and importance to Belize's history in the eighteenth–twentieth centuries. Preliminary analysis reveals life-histories of slavery and indentured servitude of individuals of African, Maya, European, and possible mixed African and European descent. We emphasize the importance of ethical responsibility to properly curate human remains once excavated, the challenges researchers face once poor curation results in lost provenience, and suggestions for scientific analysis in recovering the information lost as a result of poor excavation and/or curation methods.

Quitmyer, Katherine E. [284] see Liu, Chin-hsin

Rabinovich, Rivka [389] see Sharon, Gonen

Rabinowitz, Adam (University of Texas at Austin)

[227] *PeriodO 2: "Big Data," Linked Data, and the Reconciliation of Absolute Dates and Traditional Periodizations in Archaeology*

"Big Data" requires consistency in the structure and description of data from different sources, so that patterns in the same attributes can be identified across datasets. Unfortunately, archaeological datasets are notoriously inconsistent in both structure and terminology. Various attempts have recently been made to resolve this problem and enhance interoperability. One strategy that has worked well for the aggregation of spatially situated data involves spatial gazetteers expressed as Linked Data; these allow heterogeneous data sources to align place information through the use of unique place identifiers maintained by a shared external reference. Temporal information, however, remains a problem, as archaeological chronology is often expressed in terms of interpretive periodizations rather than absolute dates. The PeriodO project seeks to translate natural-language period terms into machine-readable coordinates in time and space. The project's first phase created a Linked Data gazetteer of period definitions, each including specific spatio-temporal boundaries explicitly stated by an authoritative source. Here we report on the second phase of the project, involving the implementation of PeriodO identifiers in large datasets. These identifiers make it possible not only to align period terms across datasets, but also to compare absolute dates with conventional period boundaries on a larger scale than ever before.

[37] *Discussant*

Raczek, Teresa (Kennesaw State University)

[167] *Micro-Regions and Materiality: Artifact Analysis at Panchmata, India*

Regional, landscape, and spatial analyses in South Asia are often conducted at large scales in order to encompass all potential sites that share a common material culture, polity, or economic system. As these analyses often overlap with culture history designations and simultaneously span multiple geographic and environmental conditions, they can obscure material diversity and human-environment relations. This paper carefully considers scale of analysis and argues that micro-regions, small areas that comprise just a few sites in the same environmental context, are the perfect size for studying material culture in South Asia. Sites within a micro-region lie within walking distance in the same ecological niche, and often draw from the same resources. Micro-regional analysis acknowledges that much social activity happens "off-site," in the fields, rivers, and woods that lie between designated archaeological sites. That is, inhabitants of micro-regions created communities that crossed site boundaries, participated in overlapping economic networks, and shared common histories. Utilizing a micro-regional framework also allows researchers to consider social formations apart from national narratives. This paper provides a micro-regional analysis of the site of Panchmata, in the Mewar Plain of northwest India with the goal of providing an alternative narrative about Indian pasts.

[269] *Discussant*

Radde, Hugh (University of California Santa Barbara)

[300] *Return to the West End Site: Zooarchaeological Results from a Tongva Village on Catalina Island*

Native American subsistence practices on the California Channel Islands are characterized by a variety of rich marine sea foods ranging from shellfish to dolphin. Fluctuation in these maritime diets throughout the Holocene has been posited to represent social and ecological phenomena in the ancient past. This poster presents recent zooarchaeological results, as well as the first radiocarbon assays, of a faunal collection that was excavated from the West End Site on Santa Catalina Island in 1972. The site has previously been characterized as a craft specialization site focused on small soapstone objects that were traded in the region. This study builds on past scholarship and expands our understanding of Island Tongva (Gabrielino) activities at this site through an analysis of the animals they incorporated into their lives.

Rademaker, Kurt (Northern Illinois University)

[226] *From Los Tapiales to Cuncaicha: Terminal Pleistocene Humans in America's High-Elevation Western Mountains*

Among Ruth Gruhn's remarkable archaeological accomplishments has been the investigation of the first truly high-elevation Paleoindian sites discovered in the Americas. The open-air camps of Los Tapiales and La Piedra del Coyote in the Guatemalan highlands, located respectively at 3,150 and 3,300 m above sea level, contained fluted Fishtail projectile points and rich, diverse tool and flake assemblages. Importantly, both sites were securely dated to ~12,500 cal BP, indicating early use of high-alpine meadow habitats beyond the limit where low-oxygen conditions affect human physiology. Provenience analysis of Los Tapiales obsidian indicated acquisition from sources 50–75 km distant to the east and the west, suggesting long-distance mobility or exchange between diverse ecological zones. Since Gruhn's seminal publications on these Guatemalan highland sites, many early sites from America's western mountains have come to light, from the Rockies, to the Central American Sierras, to the South American Andes.

Among these, Cuncacha in the high Andes of southern Peru has provided especially high-resolution data that enrich our understanding of early highland forager adaptations. There are more similarities than differences among these early sites in the western hemisphere's highlands, a pattern that calls for greater archaeological attention to mountain landscapes and international collaboration.

Rademaker, Kurt [143] see Chala-Aldana, Döbereiner

Rafferty, Janet (Mississippi State University)

[365] *Reverse Engineering Dart Point Design Requirements Using Whole Points from a Middle Woodland Site in Mississippi*

Reverse engineering involves using products of a technology, in the absence of documentation, to determine design parameters. A set of 46 whole hafted bifaces from 22OK746 in Oktibbeha County, Mississippi, which contained a Middle Woodland occupation, were studied. They were determined to be projectile points based on shared size, shape, and hafting traits with bifaces from the site that displayed impact fractures. The whole points were analyzed using parameters derived theoretically, experimentally, and empirically by other researchers to characterize dart points: shoulder width, dart/arrow index, weight, tip angle, length-thickness ratio, raw material, and cross-sectional area. The dart/arrow index showed all 46 points to be dart tips; that only half of them were identified as dart points using shoulder width was attributed to blade reworking that affected the entire blade length. Tip angle and cross-sectional area did not explain discard of these whole points, as they were within design parameters for all points. Four points were low weight. Forty-five of the 46 points were thick relative to their length, indicating that reworking had made them unusable as dart points. There is likely to be variability over time and space as to which of these parameters are most operable.

Rafferty, Sean (University at Albany, SUNY)

[229] *Recent Research in Residue Analysis in Old World and New World Contexts*

Analysis of organic residues continues to be a productive method of extracting information from prehistoric material culture. This paper presents current results of several ongoing research projects, involving several teams of researchers. Two projects present recent research into the origins of tobacco smoking through the analysis of tobacco pipes, including a sample of pipes associated with the Southeastern Late Archaic Poverty Point culture, and a second sample of pipes associated with Early Woodland cultures in Eastern North America. Shifting gears to the Old World, a third project addresses the use of secondary agricultural products in Neolithic Ukrainian sites. All three projects are multi-institutional endeavors, involving researchers from numerous universities, labs, and nations. In conclusion, we present possible directions for future research.

Raffield, Ben (Simon Fraser University)

[15] *Bands of Brothers: The Sociopolitical and Military Organization of Viking Armies during the Ninth Century*

During the mid- to late ninth century, historical sources attest to large Viking raiding fleets and "armies" operating in northwestern Europe. These itinerant groups were not only seeking plunder but also land to settle, and some managed to establish colonies and enclaves with varying long-term success. The size and impact of these groups came under scrutiny during the latter half of the twentieth century, when some scholars sought to downplay the influence of warfare as a catalyst of social and political change during the Viking Age. However, in recent years, others have begun to seriously reconsider and challenge these perspectives. It is now widely accepted, for example, that Viking "armies" could be very large indeed, and that they were powerful military and political entities in their own right. Focusing primarily on the Great Army, which was active in England during the period 865–878, this paper explores the structure and objectives of these groups through the consideration of archaeological material and contemporaneous annals. I argue that the Great Army is better considered as a mobile society or polity rather than an armed force, a distinction that has many implications for our understanding of this and other such Viking groups operating during the period.

Raffield, Ben [15] see Collard, Mark

Rageot, Maxime (University of Tübingen, Department of Pre- and Protohistory), Angela Mötsch (Regierungspräsidium Stuttgart, Landesamt für Denkm), Birgit Schorer (Landesmuseum Württemberg), Cynthia Debono Spiteri (University of Tübingen, Department of Pre- and Proto) and Philipp Stockhammer (University of Munich, Department of Pre- and Proto)

[173] *New Insights into Early Celtic Cooking and Drinking Practices: Organic Residue Analyses of Local and Imported Pottery*

Our research focuses on consumption practices, particularly on feasting in Early Iron Age Central Europe (seventh–fifth centuries BC). The aim is to integrate the cooking and drinking practices to complete our knowledge of Early Celtic societies. We try also to identify exchange networks linked to biomaterial exploitation and circulation. To conduct this study, organic residues of pottery from several Central European sites (in particular the Heuneburg and Vix–Mont Lassois) were analyzed. A wide range of local and imported pottery was studied to get an overview of dietary practices. A combination with paleoenvironmental data and studies of the origin of vessels provides potential to reconstruct resource acquisitions. In particular, a systematic consumption of beehive products appears to have been a common marker of Early Celtic diet. Importations of Southern plant oils and wine were also identified suggesting the integration of Mediterranean products and perhaps practices. Finally, meanings and functions of Mediterranean and local pottery could be specified.

Rahemtulla, Farid (Univ Northern British Columbia)

[49] *A Large Shell Midden Complex on the Outer Central Coast of British Columbia*

Site EJTa-4 located on Calvert Island is a large midden complex capped with dozens of culturally modified cedar trees, and it has revealed older cultural material in the intertidal zones. Over the last five years the Hakai Institute has supported excavations of the large, undisturbed shell midden through the University of Northern British Columbia's archaeology field school. The midden rises to 10 m above the shoreline and radiocarbon dates indicate relatively continuous use of the site for 7,500 years and possibly much longer. Like the site of Namu, which is not far away, this is one of many persistent places on the seascape that is still intact and visible due to the relatively stable sea level history in this region. These sites are repositories for ecological and cultural data that reflect fluctuations in resource availability and use over several millennia. But they are also important places on the social landscape, purpose-built landforms that are significant historic and cultural markers. This large midden in particular has a high density of faunal material as fill, and the volume of shellfish suggests that clam gardens were in use in this area perhaps by the middle Holocene.

Rai, Akanksha [18] see Means, Bernard

Railey, Jim (SWCA—Albuquerque)

[142] *Bell-Shaped Pits in the American Southwest*

Bell-shaped storage pits are a global phenomenon, and most (but not all) of these features were used for grain storage. Native Southwesterners' use of bell-shaped pits began well back in preceramic times. Both highly mobile hunter-gatherers and less mobile farmers dug and used them, and in a very general sense storage pit sizes track variation in settlement-subsistence patterns. Specifically, mobile hunter-gatherers dispersed small caches throughout their foraging ranges. This was a sort of divided-risk strategy in the face of odds that some stored food would not be revisited and recovered. Less mobile farmers, on the other hand, invested more heavily in fewer and larger storage pits, which they were prepared to defend. Part and parcel with these differences is variation in subsistence emphases on back-loaded versus front-loaded food resources.

Raja, Mussa [154] see Goncalves, Celia

Ralston, Clairia [294] see Lucas, Virginia

Ramenofsky, Ann (University of New Mexico)
[251] *Discussant*

Ramireddy, Pranavi (Hampshire College), Julia Giblin (Quinnipiac University), Jaime Ullinger (Quinnipiac University) and László Paja (University of Szeged)

[196] *An Evaluation of Preservation, Sex, and Age Using Cremains Weight and Volume from a Bronze Age Cemetery in Hungary*

In well-preserved osteoarchaeological samples, numerous anthropological methods are employed to determine age at death, biological sex, diet, and pathologies. However, with cremated human bone (cremains), determining demographic information is complicated by fragmentation and postdepositional damage. A simple way to assess variability in demographics, taphonomy, and burial treatment in cremains is to measure total bone weight and volume, which can then be examined in light of sex, age-at-death, and preservation. In this study, we present results from the analysis of cremains weight and volume from the Békés 103 cemetery. Békés 103 is a Bronze Age cemetery and settlement in Eastern Hungary; 68 burials have been excavated, a majority of which are cremations interred in urns. As predicted, well-preserved burials have higher cremains weights and volumes (with a notable exception), and young subadults (0–6 years) had lower weights than adults. Interestingly, females had variation in weight and volume, while the few confirmed males clustered together and did not necessarily have a higher weight or volume. This technique has potential for identifying anomalous individuals with respect to taphonomy, sex, and age.

Ramirez de Bryson, Luz [143] see Reinhard, Karl

Ramirez Rizo, Isaac David (Dirección de Registro Público de Monumentos y Zonas Arqueológicas e Históricas)

[328] *La importancia de Registro Público para la investigación arqueológica en México: Un análisis geoespacial de los registros de piezas en custodia de personas físicas y morales*

Los trabajos que realiza a diario la Dirección de Registro Público en el área de Bienes Muebles, generan información fundamental para conocer la dinámica actual que tienen las colecciones arqueológicas en el territorio nacional. A partir de la identificación vestigios dispersos por los Estados de la República Mexicana y tras la creación de la ley de 1972 del Instituto Nacional de Antropología e Historia, se dispuso realizar el registro de bienes; uno de sus objetivos fue regular y conocer la existencia de las piezas que tiene en custodia las personas físicas y morales. Durante los años que se inició con esta labor, se requirió visualizar la existencia de cambios sobre la cantidad de registros que se realizan anualmente en el país. La propuesta para observar dicho cambio, fue la realización de un mapa con parámetros geo-estadísticos para analizar la distribución de las colecciones que se han realizado en toda la nación. Con lo anterior, se tiene la finalidad de abrir campos para la investigación sobre el tema del coleccionismo en México, por medio de una plataforma georreferenciada de las colecciones reguladas por la Dirección de Registro Público de Monumentos y Zonas Arqueológicas e Históricas.

[328] *Chair*

Ramirez-Urrea de Swartz, Susana (Universidad de Guadalajara)

[288] *Flying on the West: The Butterfly Imagery in the Aztlán Iconography: Meaning and Worldview.*

The Aztlán Tradition is a widespread cultural and economic system in west and northwest Mexico from AD 850 to 1300. The Aztlán iconography is remarkable, not only because it is rich in the variety of images and icons related to the codices, but also because it reflects a concept related to the worldview of the Aztlán groups (and others in central Mexico and the Mixteca-Puebla region). Butterfly imagery seems to be part of it. Some of the ceremonial vessels used in rituals or found as part of the burial offerings present representations of butterflies. Also in the codex style, they might appear as icons or as part of the dresses, headdresses, or as adornments such as nose rings of some lords, priests or gods or goddess such as Mixcoatl or Itzpapalotl. It has been observed that some butterfly representations seem to have feathers, which could be related to birds. This preliminary study first explores the presence and distribution of the butterfly imagery in the Aztlán Tradition, second, the possible meanings in the worldview of the groups, and third, whether it was an ideological concept limited to the rulers and/or priests.

Ramon Celis, Pedro (INAH Oaxaca)

[200] *Contextos funerarios Posclásicos en San Pedro Nexicho Oaxaca: Análisis preliminares de un sitio de la Sierra Juárez*

Recientes trabajos de exploración llevados a cabo en la población de San Pedro Nexicho, ubicado en la Sierra Norte de Oaxaca, se han enfocado en el registro y análisis de cinco tumbas ubicadas en un sitio posclásico zapoteca. Las investigaciones en esta región han sido someras, por lo que encontrar contextos tan complejos y explorarlos con una metodología controlada nos ha ofrecido uno de los conjuntos de materiales arqueológicos más importantes para la comprensión integral de las relaciones de intercambio y políticas de las poblaciones Zapotecas al momento del contacto europeo. En esta presentación se discutirá la metodología que se llevó a cabo así como las inferencias logradas a través de esta, en el estudio de cinco tumbas excavadas en el sitio durante el año 2015

[200] *Chair*

Ramos, Elizabeth

[69] *Applied Zooarchaeology, Food Practices, Conservation Biology Programs, and Contemporary Cultural Traditions in the Caribbean Region of Colombia*

At present, human population groups in the Colombian Caribbean, in common with people from most regions of the world, face problems associated with the sustainability of resources that results to a large extent from the indiscriminate use of plant and animal species for food among other uses. The

phenomenon not only impacts plant and animal species but rebounds, too, on human beings. Although governmental and nongovernmental bodies have made some efforts to implement preventive programs designed to protect both the endangered species and human population groups, the hoped-for results have not been achieved. On the one hand, this paper discusses the Caribbean region of Colombia, the contribution of anthropological and in particular archaeological research to reconstructing the history of food practices associated to the use of animal's species since prehispanic times, many of which are now under threat. On the other hand, it discusses the contribution that the results obtained in the frame of this particular research program can make to conservation biology programs in the region.

Ramos, Jorge [71] see Li, XinWei

Ramsay, Jennifer (College at Brockport, SUNY) and Geoffrey Hedges (University of Connecticut)

[151] *Evidence of Destruction at the End of the Early Bronze Age III Period at Khirbet Iskander, Jordan: An Archaeobotanical Perspective*

The Early Bronze Age site of Khirbet Iskander is located on the central plateau, south of Madaba, Jordan. Excavations at the site have focused primarily on the fortified Early Bronze Age III (EBIII) city remains and the transition to the Early Bronze Age IV (EBIV) agricultural settlement. The well-known and much debated collapse or abandonment of the early cities at the end of the EBIII has been documented at many sites in the Levant and is evident at Khirbet Iskander as well. Excavations of building collapse document the destruction at Khirbet Iskander and large quantities of carbonized food stores that were recovered from EBIII levels support this event. Thousands of barley grains (*Hordeum vulgare*) and lentils (*Lens culinaris*), as well as significant quantities of emmer wheat (*Triticum dicoccum*), common pea (*Pisum sativum*) and chick peas (*Cicer arietinum*) attest to the agricultural nature of the region and the vital role of storage in early complex societies. This poster documents the archaeobotanical assemblage from Khirbet Iskander in order to gain a better understanding of the implications of the destruction of food resources and the role of the agricultural economy at the end of the EBIII period.

Ramsey, Monica (University of Toronto)

[95] *A Growing Investment in "Place": Exploring Late Pleistocene Perceptions of "Nature" in the Southern Levant*

The concept of "place" is given structure and meaning by human experience and can be viewed in several forms, including art, monuments and architecture. However, the by-products and material remains associated with the impacts of daily hunter-gatherer place-making, including food and material production as well as processing waste, are also important expressions of human experience and the construction of "place." These material remains provide critical archaeological insight into how people in the past organized their world and perhaps, how they perceived their relationship with "nature." This paper uses microbotanical evidence from dwelling structures, foodways, and broader landscape impacts at Kharaneh IV and Ayn Qasiyya in the Azraq Basin, building upon previously published environmental, mortuary and material assemblage evidence from the broader region, to explore Late Pleistocene (ca. 23–14.5 ka cal. BP) hunter-gatherer perceptions of "place" and "nature" in the Southern Levant. There is mounting evidence during this period for symbolic behaviors and territoriality. Moreover, increasingly settled lifestyles and the expansion of anthropogenic landscapes reflect a growing investment in "place." Significantly, this suggests social pressures as much as environmental ones, progressively impacted hunter-gatherer lifeways.

[95] *Chair*

Ramsey Ford, Dawn (HDR, Inc.)

[46] *Forgotten World War II Landscapes: Data Gaps in the Documentation of Fort J.H. Smith and Fort Tidball, Kodiak Island, Alaska*

Coastal Alaska played an important role in U.S. defenses for the Pacific Theater during World War II. Many resources on Kodiak Island have been listed on the National Register of Historic Places. These include the Kodiak Naval Operations Base, Fort Greely, and Fort Abercrombie, which are listed together as a National Historic Landmark. Two other installations within the military command structure on Kodiak Island include Fort Tidball and Fort J.H. Smith. These two installations and the batteries under their command were part of the larger command network in the Pacific Theater and should be considered and documented as important components of a complex World War II landscape on Kodiak Island. This poster will address components of the two military installations and the challenges of incorporating large landscapes and historic districts into Section 106 compliance activities.

Ran, Weiye and John Walden

[101] *Organization of Late Classic Maya Polities in Rosario Valley, Mexico*

This presentation focuses on intra and inter polity organization of the Late Classic (AD 600–900) Maya polities in the Rosario Valley, Mexico. Past approaches have generally used civic-ceremonial architecture to investigate settlement hierarchy, here however, the focus is turned to interaction. This approach explores how the strength of interactions between settlements can be used to explore political hierarchy. To measure the strength of interactions, a formula borrowed from the law of gravity is applied to calculate the degree of possible interaction based on the population of settlements and the distances between them. Following this, these webs of interaction are used to distinguish the core, peripheral and marginal areas of each polity, as well as the potential interactions between different polities. The results from this interaction based analysis differ from those based on the civic-ceremonial architecture. This suggests that bureaucratic administration based on civic-ceremonial centers may not have been the case in the Rosario Valley. The results also imply that one important function of civic-ceremonial architecture could relate to enhancing interaction within the region.

Randall, Lindsay (Robert S. Peabody Museum of Archaeology) and Bethany Jay (Salem State University)

[122] *Hidden Histories: Using Archaeology to Teach Slavery in the Secondary Classroom*

There are many challenges that educators face when teaching slavery in middle and high school classrooms. Archaeology-centered activities offer unique ways to talk about and incorporate histories often left out of the historical record in a manner that can engage students in important and meaningful conversations on the subject. The authors will share their experiences and strategies in using archaeology as a lens to talk with students and teachers about this important period in American history.

Randall, Vincent [106] see Herr, Sarah

Rando, Carolyn [14] see Tobe, Shanan S.

Ranhorn, Kathryn L. [87] see Warren, Shannon

Rankin, Jennifer (Temple University/AECOM) and R. Michael Stewart (Temple University/New Jersey Historic Preservation)**[262]** *The Snyder Paleoindian Complex in New Jersey: Interpreting Intra/Intersite Spatial Patterning*

The Snyder Site Complex consists of stratified, multicomponent prehistoric localities at Carpentersville, New Jersey, situated on a series of terraces adjacent to the Delaware River. The Paleoindian components of the complex stand out because of the extensive landscapes involved, the number of fluted bifaces and diagnostic tool types that can be associated with occupations, and the fact that it is revisited throughout the Paleoindian period. Research that has been completed at the complex has placed it in the context of Paleoindian studies in the Delaware Valley. Factors that may have influenced the repeated use of complex landscapes are considered including: the ecology and resource potential of the environmental setting; proximity to sources of chert and jasper toolstone; its role as a potential gathering place, a location convenient to the territories of a number of Paleoindian bands, where exchanges of information, trade, and socializing could take place; and its positioning along what may be a travel route linking the Delaware Valley and Middle Atlantic Region with Paleoindian territories of the greater Northeast. Site complexes like Snyder, spread over large areas, emphasize the importance of a landscape perspective and intra/intersite spatial patterning when identifying and interpreting archaeological deposits.

Rankin, Caitlin (Washington University in St. Louis)**[283]** *A Concealed Landscape: New Evidence from the North Plaza*

Recent soil coring and reexamination of mound height changes through time have revealed an extremely high historic sedimentation rate of 5.2 cm per year in the North Plaza, resulting in deep burial (around 4 m) of the Mississippian landscape. Modernly, the North Plaza is noticeably lower than other plazas surrounding Monks Mounds; however, the North Plaza would have been a dramatic topographic feature during Mississippian occupation. The discovery of landscape 6 m lower than the rest of Cahokia questions previous assumptions regarding the North Plaza's function as a mound and plaza group.

Ranslow, Mandy (Connecticut Department of Transportation) and Sarah P. Sportman (Archaeological and Historical Services, Inc.)**[16]** *Preliminary Results from a Late Archaic Site in Canaan, Connecticut*

Robbins Swamp is a large freshwater swamp located within the Housatonic River drainage in Litchfield County, Connecticut. Archaeological sites within its environs and along nearby rivers date from the Paleoindian period through the Woodland period, indicating the wetland and nearby rivers and streams were an important resource for Native Americans for over 12,000 years. With the exception of George Nicholas's extensive work for his dissertation, which identified 500 additional sites, few professional excavations have been conducted in the area. A railroad project initiated by the Connecticut Department of Transportation resulted in a data recovery of archaeological site 21-85 in Canaan prior to the construction of an access road, as required under state and federal law. This paper presents the preliminary results of our recent excavations of a Late Archaic encampment, located just south of the swamp, on the Hollenbeck River, a tributary of the Housatonic River.

Rapp Py-Daniel, Anne [327] see Schmidt, Morgan

Rareshide, Elisabeth (University of California, Santa Barbara)**[98]** *Chinigchinich Ritual Practice among the Tongva: Exploring Patterns of Colonial Consumption and Revitalization*

The Mission Period in Alta California (AD 1769–1834) radically changed the lives of indigenous people such as the Tongva. The strict discipline of the Franciscans' enculturation program in the missions contrasted with the relative autonomy of Tongva people on San Clemente Island. Evidence of ritual practice of the Chinigchinich religion at sites such as Lemon Tank on San Clemente Island suggests continuity in Tongva ritual practice into the Mission Period. At the same time, Spanish missionaries and colonists introduced new material culture that the Tongva selectively incorporated or excluded in their traditions. Therefore patterns of consumption of native and foreign material culture may reveal new layers of meaning in persistent ritual practices. The abundance of shell beads and relative dearth of glass beads at Lemon Tank suggests that San Clemente Islanders may have shunned Spanish material culture in their ritual practices. If Tongva people were actively avoiding incorporating colonial material culture (such as glass beads) in their ritual practices, then the Chinigchinich religion could have been part of a nativistic revitalization movement in which people tried to expunge colonial influence.

Rascón, Rogelio**[137]** *Arqueología en la Sierra Sur de Oaxaca: El sitio fortaleza de Quiavicuzas*

El área geográfica denominada Sierra Sur es una de las 8 regiones que comprende el estado de Oaxaca. Desde épocas muy antiguas, las sociedades aquí establecidas han presentado un desarrollo paralelo a los demás grupos culturales que caracterizaron la superárea denominada Mesoamérica. Hasta hace algunas décadas, se pensaba que dichos grupos estuvieron aislados, lejos de la influencia de grandes centros rectores como Teotihuacán, o en su caso Monte Albán. Durante el desarrollo correspondiente a una de las nuevas carreteras en el estado de Oaxaca (sureste de México), que comunicará esta importante región con la costa del Pacífico, se exploró una serie de sitios arqueológicos, permitiendo comprender una compleja dinámica social en la que estaba inmersa la Sierra Sur, o Mixe. Quiavicuzas actualmente corresponde a una pequeña población ubicada en uno de los puntos más elevados y apartados de la región Mixe. Gracias a las investigaciones recientes, ha sido posible observar una influencia directa de grupos ubicados a grandes distancias geográficas; por el momento se valora si ésta estuvo ligada directamente al sometimiento, la guerra, o en su caso si se debió al comercio e intercambio regional a gran escala, relacionado a una de las principales rutas comerciales de Mesoamérica.

Rasic, Jeffrey (National Park Service), Joshua Reuther (University of Alaska Museum), P. Gregory Hare (Cultural Services Branch, Department of Tourism &) and Robert J. Speakman (University of Georgia, Center for Applied Isotope)**[88]** *13,000 Years of Obsidian Prospecting in Eastern Beringia: A Status Report on Obsidian Source Studies in Alaska and Yukon*

The archaeological record of Eastern Beringia plays an important role in understanding global human dispersals and settlement, and is a proving ground for testing ideas about high latitude hunter-gatherer land use, technology, and socioeconomic interaction. Obsidian provenance studies provide an excellent means to address these issues. Since 2006 we have compiled, organized, and generated new obsidian geochemical analyses for more than 11,000 artifacts from 1,200 sites across Alaska and Yukon Territory using portable X-ray fluorescence (pXRF) and laser ablation inductively coupled plasma mass spectroscopy (LA-ICP-MS). More than 60 geochemically distinct obsidian groups have been defined, and the major geological sources of obsidian have been pinpointed. A well-developed framework for successful provenance analysis is now available. Here we describe the major obsidian sources for the region and recommend a standardized terminology for source locations and geochemical groups. We share key insights about prehistoric raw material procurement and distribution gained from this exceptionally large and geographically expansive dataset, including 1) a surprisingly rapid pace of landscape learning and identification of obsidian sources upon initial human colonization in each subregion, and 2) the tremendous influence raw material package size exerts on the distribution extent of obsidian from a particular source.

Rasic, Jeffrey [257] see Urban, Thomas

Rautman, Alison (Michigan State University)

[129] *Ritual and Feasting in the Field: The Role of Theoretically Informed Practice in Creating Resilience within the Archaeological Field Crew*
Katherine Spielmann has contributed to the scholarly literature on ritual and feasting, the archaeology of sustainable and resilient societies, and long-term economic and social changes in archaeological record of the Salinas region in central New Mexico. Less well-known, however, are her long-term contributions to the performance dimensions of these models. In fact, her theoretically informed archaeological practices, implemented in the context of the undergraduate field school, illustrate the importance of ritual and also feasting in fostering productive and resilient working relationships among crew members in the small-scale, short-lived social world of archaeological field work.

Ravesloot, John (EcoPlan Associates, Inc.)

[84] *Full-Coverage Regional Surveys: Insights Gained about Hohokam, Akimel O'odham (Pima), and Pee Posh (Maricopa) Landscape Use*
Full-coverage regional archaeological surveys conducted throughout the world in diverse environmental contexts have demonstrated the advantages of this methodology for addressing a broad range of anthropological issues. The Northern Tucson Basin Survey (1980–1987) directed by Suzanne and Paul Fish represents the first application of this methodology to document prehistoric Hohokam settlement and land use. Contiguous survey blocks centered on three Classic Period platform mounds and their associated settlement complexes, located primarily in a non-riverine context, covered more than 470 km². The survey data acquired have contributed significantly to our understanding of the organization of Hohokam communities. Based on the success of the Fishes research project, a full-coverage approach was implemented by the Gila River Indian Community's Pima Maricopa Irrigation Project (1994–2004) to survey 140,000 acres (567 km²) of the reservation. This paper discusses some of the insights gained from the Gila River full-coverage survey regarding Hohokam and historic Pima-Maricopa use of a riverine environment. The survey enabled examination of topics such as settlement response to changing geomorphic landscapes, the organization of Hohokam communities and irrigation systems, understanding the use of nonresidential spaces between villages, and protohistoric and postcontact Akimel O'odham (Pima) and Pee Posh (Maricopa) settlement dynamics.

Rawski, Zoe (University of Texas at San Antonio)

[187] *Refining Architectural Classifications of Preclassic Monumentality at Early Xunantunich, Belize*

The site of Early Xunantunich in Belize provides us with a rare opportunity to conduct large scale investigations of Preclassic architecture due to its lack of Classic Period overburden. Since 2008, ongoing excavations at the site have yielded a wealth of information regarding Preclassic activities in the area. However, recent investigations of a monumental flat-topped platform at the site have illuminated issues with the ways in which we describe and classify these early structures. In this paper, we argue that the current typologies used to describe Preclassic monumental architecture are insufficient and obscure our ability to make meaningful formal comparisons. In particular, we argue that the blanket terms used to describe Preclassic platforms must be honed and refined in order to reflect important distinctions in both the form and function of these structures. Such distinctions would facilitate a deeper understanding of early monumental forms, enabling us to rethink the symbolic meanings being conveyed through early civic and ceremonial centers. Finally, by distinguishing between these varying forms, we can begin to explore the processes of accumulation and architectural repurposing that led to the expansion or abandonment of these structures during the Classic Period.

Ray, Erin (University of New Mexico) and Holley Moyes (University of California, Merced)

[68] *The Archaeologists Role in Looting: Commodity Fetishism and the Tragedy of the Commons*

In Marxist philosophy, commodity fetishism imbues an object with a value not inherent to the object itself. This paper explores the ways in which archaeologists have contributed to the fetishizing of archaeological material which in turn promotes the looting of archaeological sites. By nature of our profession, old objects hold more value than modern ones or even replicas. Contextual information about these objects is arguably just as, if not more, important than the object itself. In many communities where archaeologists work, we transfer the perceived value of old objects to members of the community. But the value of the contextual information is not transmitted. We suspect that our selective transmission may lead to a tragedy of the commons in which individuals outside of the profession consume or loot a shared resource—the archaeological record. We will take a critical look at how we as archaeologists influence looting and suggest possible solutions at a community level.

Ray, Jack [89] see Bruns, Laura

Raymond, David [300] see Curran, Joseph

Raymond, J. Scott

[270] *Discussant*

Raymond, Tiffany (Binghamton University) and Carl Lipo (Binghamton University)

[364] *Spatial and Temporal Variation of Prehistoric Cultural Elaboration in the Yazoo Basin of Mississippi*

The Yazoo Basin of Mississippi is a rich and varied landscape that has been inhabited by humans for millennia. Sediment cores and tree-ring dates have documented that populations living in the basin had to contend with massive flooding events as well as substantial environmental change over the course of the Holocene. Populations contended with these changes by shifting settlement patterns, altering in subsistence strategies, engaging in intergroup competition, as well as varying investments in cultural elaboration. The freshwater mussel shell ring phenomenon that emerged during the Archaic and Woodland periods, for example, may reflect a combination of these factors. This paper explores the degree to which spatial and temporal patterns of refuse deposition can be explained as cultural responses to environmental instability during the Archaic through Mississippian periods.

Ready, Elspeth (Stanford University)

[85] *Chair*

Ready, Elspeth [85] see Boileau, Arianne

Real Margalef, Cristina (Universidad de Valencia), Aleix Eixea (Universidad de Valencia), Alfred Sanchis (Museo de Prehistoria de Valencia), João Zilhão (ICREA. Universidad de Barcelona) and Valentín Villaverde (Universidad de Valencia)

[169] *Unraveling a Neanderthal Palimpsest from a Zooarchaeological and Lithic Perspective: Abrigo de la Quebrada Level IV (Valencia, Spain)*

Excavations at Abrigo de la Quebrada (Chelva, Valencia) have revealed nine archaeological levels belonging to Neanderthal occupations. Level IV, characterized by a high density of lithic (>18,000) and bone (>100,000) remains, has been dated with AMS between 43,930±750 BP (Beta-244002) and >50.8 ka BP (OxA-24855). Human presence in the shelter has been favored by its location, giving rise to a kind of natural trap where hunting animals would be feasible. The immediate environment is varied (abrupt and plain zones), allowing the presence of a wide range of prey. The high density of lithic and bone elements and the large number of combustion structural remains with small variations in spatial distribution reflect a typical structure of palimpsest with frequent, repeated and seasonal occupations with intense on-site processing. The characteristics of the sample (seasonality, exploitation intensity, taphonomic data, lithic refits and raw materials) support that idea and tell us about short-term occupations; the absence of modification by carnivores facilitates the study of the Neanderthal behavior. With this study we have obtained more information on the subsistence and behavior of Neanderthal groups, which can be compared to other regional contexts in the central area of the Mediterranean Iberian.

Reamer, Justin (University of Pennsylvania- Department of Anthropology)

[52] *Reconsidering the Monuments of the Precontact Peoples of the Northeastern United States*

In the literature on monumentality there is little to no discussion of precontact Native American monuments in the northeastern United States. However, this does not mean the region was completely devoid of monumental architecture before the arrival of European, but monuments are not a common topic of archaeological research in the northeast. In this paper, I will discuss two structures—shell mounds, and stone and brush heaps—and argue that they should be discussed as monuments and further studied by archaeologists trying to understand the precolonial societies of the northeastern United States. I will first discuss the documentation of shell mounds and stone and brush heaps in ethnohistoric and survey records, such as those of Cyrus Thomas. I then will argue for why these structures should be included in archaeological discussions of monumentality. While I recognize the problems that keep archaeologists from studying these structures, I argue that this neglects an important aspect of the archaeological record. Lastly, I make an argument for how archaeologists of the northeastern United States can further our study of these structures to gain a fuller picture of the region's archaeology.

Reaux, Derek (University of Nevada, Reno), Geoffrey Smith (University of Nevada, Reno), Ken Adams (Desert Research Institute), Nicole George (University of Nevada, Reno) and Sophia Jamaldin (University of Nevada, Reno)

[140] *Preliminary Results from the Paleoindian Record of Guano Valley, Oregon*

Guano Valley is located between Warner and Catlow valleys. Relative to the surrounding valleys, it has received little attention from professional archaeologists over the years despite early visits by Luther Cressman. During the 2016 field season, the Great Basin Paleoindian Research Unit (University of Nevada, Reno) began a long-term research project in Guano Valley focused on searching for Paleoindian sites in the area. Although our work is in its infancy, we have already uncovered a very rich record of Terminal Pleistocene/Early Holocene (TP/EH) occupation associated with a delta system that likely brought fresh water into the basin while those sites were occupied. Because TP/EH lakes in Guano Valley were stable for long periods due to the presence of a low sill above which they could not rise at the northern end of the basin, the valley likely supported a long-term productive marsh system that attracted early groups to the area.

Reber, Eleanora (UNC Wilmington), Mark Rees (University of Louisiana at Lafayette) and Samuel Huey (University of Louisiana at Lafayette)

[173] *Cautious vs. Interesting: Cultural Interpretation of Absorbed Organic Pottery Residues*

Absorbed organic pottery analysis is a technically easy but interpretively difficult branch of archaeometry. Given the complex interaction between organic chemistry, pot use, pyrolytic effects, depositional effects, and modern contamination, it is often difficult to balance interpretations between appropriately cautious and culturally and anthropologically useful information. This issue is illustrated through the analysis and interpretation of a suite of absorbed organic pottery residues extracted from pottery excavated from the Louisiana Gulf coast. Compounds in these sherds result from a complex mixture of events, including archaeological usage, the Deepwater Horizon oil spill, post-spill use of dispersants, and normal depositional issues. How do we untangle these interlocking cultural events to produce a meaningful interpretation?

Reber, Eleanora [154] see El-Behaedi, Raghda

Rebollar, Paola May [384] see Miller, Paul R. M.

Reckin, Rachel [88] see Brush, Emily

Redding, Richard (Kelsey Museum, University of Michigan) and Andrea Poli (University of Michigan, Department of Mechanical E)

[85] *Assessing Differential Fragmentation of Mammal Bone: A New Proxy*

Relative bone density has been utilized as a proxy for differences in survivability among mammal bones during pre- and postdepositional fragmentation/destruction processes. Since bone remodels during an animal's lifetime to resist directional forces and cancellous bone forms patterns of trabeculae oriented in directions to compensate for forces exerted on the bone, I think that estimates of density of a bone are an inadequate proxy for survivability. In an attempt to develop a new proxy for survivability I have subjected bones from sheep to force using a drop tower. The height of the drop was varied to generate between 7.5 and 15 Joules. A piezoelectric sensor measured the amount of force, in Newtons, required to fracture an element. A graph of force, overtime, describes the fracture of each element. The force required to fracture each element is compared to the bone density estimates for sheep. Also, patterns of fracture were recorded. Secondary and tertiary drops were conducted to further fragment the elements. In a future study the fracture patterns obtained will be compared to the fractures observed in archaeological faunas from Egypt.

Redhouse, David [133] see Stoddart, Simon

Redmond, Elsa (American Museum of Natural History)

[278] *Chair*

Redmond, Elsa [278] see Spencer, Charles

Reed, David (University of Michigan), W. Scott Zeleznik (Michigan) and Nan Gonlin (Bellevue Community College)

[80] *Nighttime Food of the Ancient Maya*

Societies, present and past, consume particular foods at certain times of the day, and these foods often symbolize quotidian practices. Even in American culture, certain foods are taboo at certain times and in certain contexts, such as dessert after breakfast or the increasing concern of healthy eating with respect to bedtime snacking. Food functions as a social vehicle beyond its nutritional value, and mealtimes or food events serve as occasions to reinforce culturally appropriate behaviors. Furthermore, chronobiology posits that the circadian rhythm influences metabolism and food consumption patterns. We have previously shown that food is a marker of social distinction for the ancient Maya through paleodietary reconstructions, production technologies, bioarchaeological analyses, and glyphic readings. Whether for energy replenishment or ritual purposes, we expand on previous work to begin understanding the sustenance of the Maya diet and how nighttime eating was distinguished from consumption at other times of the day. Drawing on a larger theoretical perspective, consumption practices are set in the context of agents and recursive structures that established enduring practices of routinized and ritualized nighttime food consumption and how that may have aided social structures of inclusion and exclusion, and reinforced social connections and possibly dominance hierarchies.

Reed, Lori (Aztec Ruins National Monument)**[373] *The Late Bonito Phase at Aztec North and West Ruins: Interpreting the Ceramic Data***

Pottery from Earl Morris's excavations in Late Bonito phase contexts at Aztec West Ruin and recent surface collections at Aztec North Ruin are examined to shed further light on Chacoan period developments at these two great houses. Morris's early twentieth-century excavations focused specifically on West Ruin, but the North and East Ruins filled out the triad of great houses comprising a substantial complex within the modern boundary of Aztec Ruins National Monument. Several researchers have suggested that North Ruin was the first great house constructed at Aztec, representing a local interpretation of a Chacoan great house. In contrast, West Ruin was built several decades later by Chacoan engineers and specialists who were intent on building in the meticulous and grand style of Chaco Canyon and establishing a new great house complex in the Animas River valley. In this paper, I look at the Late Bonito phase occupations of both Aztec North and West great houses, examine the local and Chacoan ceramic traits, and evaluate the extent of Chaco's reach via the pottery assemblages.

Reed, Paul (Archaeology Southwest)**[266] *Blending Architectural Traditions at the Edge of Cibola, New Mexico***

The archaeological zone south of Grants, New Mexico, and north of Quemado, New Mexico, has long represented an enigma for southwestern archaeologists. Straddling the so-called Mogollon-Pueblo boundary and lying south of the boundary between the Pueblos of Acoma and Zuni, its archaeology combines traits of multiple cultural traditions. Detailed recording at sites in the area reveals a mix of architectural approaches including use of adobe, sandstone, and igneous rock—often at the same site. This paper explores architectural variation to track fluidity in construction and concomitant cultural identity at the edge of Cibola.

Reed, Paul [301] see Schachner, Gregson

Reeder-Myers, Leslie (Smithsonian Institution) and Torben Rick (Smithsonian Institution)**[224] *Shell Middens and Sea Level Rise: Learning from the Past and Preparing for the Future***

Shell middens, like other forms of coastal cultural heritage, are heavily threatened by sea level rise, climate change, and human land use. These sites, however, store information about these same challenges in the past. We present results from recent research near the mouth of the Rhode River, a small sub-estuary of Chesapeake Bay in eastern North America. We chose an area we knew well, having worked on the 31 previously recorded shell middens, to test the importance of more specialized techniques aimed at rapidly assessing and mitigating loss of shell middens. We employed a three-step process—modeling to understand the distribution of threats, targeted survey to locate sites, and radiocarbon dating to understand the timing of settlement. We relocated eight sites believed to be lost to sea level rise and identified 16 new sites using specialized survey techniques, including survey by kayak during extreme winter low tides. Through extensive radiocarbon dating, we were able to refine our previous conclusions about settlement in this region, including the elimination of an apparent settlement gap between the Late Woodland and Historic periods. Our results suggest that similar survey techniques may be a valuable addition to research strategies along submerging coastlines around the world.

Reedy, Crystal [40] see Eren, Metin

Reents-Budet, Dorie [39] see Bishop, Ronald L.

Reents-Budet, Dorie (Smithsonian Institution), Annabeth Headrick (Denver University) and Ronald L. Bishop (Smithsonian Institution)**[182] *Entangled Ideologies on the Pacific Coast: The Teotihuacán-Style Maya Censers from the Department of Escuintla, Guatemala***

Teotihuacán-style censers from the Pacific Coast of Guatemala are seminal markers of "international" interaction and ideology during the Early Classic Period (250–550 CE). But the paucity of archaeological data for this artifact class and the lack of recent in-depth analysis of their iconographic narratives leave unexplored a potential body of material concerning interaction, identity, and ideological shifts in this gateway region of southern Mesoamerica. Data from archaeological investigations, iconographic studies, and nuclear chemistry are brought to bear on a group of more than 15 censers from the region to address the function and meaning of these ritual objects and their potential for investigating the sociopolitical and ideological motivations steering the region's Early Classic communities.

[392] *Discussant***Reepmeyer, Christian (James Cook University), Mathieu Leclerc (Australian National University), Karen Joyce (James Cook University), Geoffrey Clark (Australian National University) and Daud A. Tanudirjo (Universitas Gadjah Mada)****[302] *A New Method for the Identification of Temper in Pottery***

This poster presents new research on a novel technique to analyse temper in archaeological ceramics. The outcome of the study was to assess whether petrographic analysis of temper grains can be automated through the combination of mineral mapping and remote sensing. Ten pottery samples were analyzed by automated mineral mapping. The output of analysis is an image of mineral distribution, based on 15 micron spot analyses, with a quantification of total abundances of minerals in the sample. The addition of remote sensing technique allows the processing of the image combining analysis points to grains, which then allows the quantification, as well as the analysis of structural and spatial distribution of temper grains in the sample. Here, I will highlight some challenges encountered throughout the experiment and will propose future directions of this research.

Rees, Mark (Louisiana Public Archaeology Lab, University of Louisiana at Lafayette), Samuel Huey (Louisiana Public Archaeology Lab, University of Lo) and Scott Sorset (Bureau of Ocean Energy Management)

[124] *Assessment of the Effects of an Oil Spill on the Disaster Archaeology of Louisiana's Gulf Coast*

In April of 2010, the Macondo well blowout and Deepwater Horizon drilling rig explosion led to the discharge of an estimated 4.9 million barrels of crude oil from Mississippi Canyon Block 252 (MC 252) in the north-central Gulf of Mexico. Within three months the Macondo blowout became the largest marine oil spill in history, impacting more than 1,000 miles of shoreline. Disaster response and cleanup were followed by studies of subsequent impacts on coastal and marine ecology, natural resources, health, and lifeways of people affected by the spill. The long-term effects on cultural resources are only now beginning to be understood. Eight archaeological sites on the Gulf Coast of Louisiana were assessed for the effects of hydrocarbon contamination from the Macondo oil spill as part of a cooperative agreement between the Bureau of Ocean Energy Management and the University of Louisiana at Lafayette. Hydrocarbons found in sediment samples and ceramic sherds have been sourced to MC 252. In addition to the effects on archaeometric techniques and site formation processes, we consider the implications for future archaeological investigations, cultural resource management planning, and disaster archaeology on Louisiana's Gulf Coast.

Rees, Mark [173] see Reber, Eleanora

Reese, Kelsey (University of Notre Dame), Molly Iott (University of Notre Dame), Katherine Portman (University of Notre Dame), Donna Glowacki (University of Notre Dame) and James Potter (PaleoWest Foundation)

[155] *Pottery Production at Cowboy Wash Pueblo: A Central Village on the Ute Piedmont Frontier*

Cowboy Wash Pueblo (5MT7740), south of Sleeping Ute Mountain in the Northern San Juan Region, is the largest and latest pueblo in the Cowboy Wash Community. In collaboration with the Ute Mountain Ute Tribe, Potter and colleagues (2013) recorded a large rubble area (~1000 m²), 13 pit structures, a potential D-shaped structure, and a surprisingly sparse surface assemblage (n = 206). They also noted that the east edge of the pueblo is endangered by arroyo cutting. Due to this and because it was unclear if the surface pottery was representative of its occupation, the CU-Boulder field school (2016), under the direction of Potter and Ortman, conducted test excavations in an exposed room, kiva, and 13 midden units. This poster presents the results of an analysis of pottery from these excavations. Included in these contexts was an unfired corrugated vessel and raw materials used in its production on the floor of the kiva. Results reveal a short-occupation period during the AD 1225–1280 interval, patterning in the distributions of vessel form and design, and information about pottery production, acquisition, and the aggregation process when the village was established.

Reese-Taylor, Kathryn

[337] *Creating the Center: Interaction in the Central Karstic Uplands during the Preclassic*

From roughly 800 BCE, evidence supports the development of a widespread regional interaction sphere centered in the Central Karstic Uplands. This paper discusses specific data regarding the origins of this network and the subsequent integration of the Central Karstic Uplands as an economic force in the Maya lowlands. Scholars have long recognized the strong affiliations among the major cities that comprise this network during the Preclassic. Recently artifacts recovered from sites point to extensive trade with distant regions. Further architectural layout and city planning suggest major ties to other areas in the Maya lowlands, such as the Northern Yucatán and the Chetumal Bay area. No doubt, the strategic location of the Central Karstic Uplands with regard to transportation and the development of an extensive road system in the Preclassic contributed to its development as a major commercial hub for cross peninsular exchange and beyond. Finally, we suggest that the control of trade by centers in the Central Karstic Uplands was a major factor in the precocious urbanization of the region.

[337] *Chair*

Reese-Taylor, Kathryn [337] see Anaya Hernández, Armando

Reetz, Elizabeth C. (University of Iowa Office of the State Archaeologist)

[206] *Moderator*

[97] *Discussant*

Reeves, Jonathan S. (George Washington University), David Braun (George Washington University) and Matthew Douglass (University Nebraska-Lincoln)

[305] *Behavioral Inferences from Early Stone Age Sites: A View from the Koobi Fora Formation*

The Early Stone Age record is a spatially continuous palimpsest representing thousands of years of artifact discard. The record thus reflects a long-term pattern of hominin movement at a landscape scale. Despite this, most recent research continues to employ interpretive perspectives suited for finer temporal grains and relies on targeted excavation of dense concentrations of artifacts. Here 'sites' are investigated as discrete functionally organized places and analytically interpreted based on differences in gross artifact density and the frequencies of different techno-technological forms. Such a perspective ignores the spatial extent, formational complexity and temporal depth of this record. What is needed instead is a better understanding of the behavioral processes that contribute to the formation of the record at broader scales. Here we investigate the regional structure of the archaeological record through the lens of movement. We apply assemblage-scale measures to quantify movement of stone across the Okote Member in the Koobi Fora Formation. Results demonstrate that hominin movement patterns structure the archaeological record at large spatial scales. We suggest that a movement-ecology framework is better suited for understanding the Early Pleistocene record than activities facies or cultural-historical models. This research is supported by NSF-IRES(OISE-1358178 and 1358200).

Reeves, Jonathan S. [38] see Braun, David R.

Regev, Lior [338] see Caracuta, Valentina

Regnier, Amanda [87] see Hammerstedt, Scott

Rehm, Gabriel [305] see Fadem, Cynthia M.

Rehren, Thilo [26] see Chen, Kunlong

Reich, David [92] see Kim, Alexander

Reichert, Susanne [25] see Bemann, Jan

Reid, Andrew (University College London)

[76] *Longevity and Authority in a Mobile World the Megasites of the Ugandan Grasslands*

Much of the recent past of Great Lakes Africa is characterized by short-lived settlements and mobile societies that produced ephemeral occupation sites. In part because of this, attention has long been drawn to sites like Bigo and Ntuusi which seem to offer much more substantive archaeological remains. Yet, notwithstanding the longevity of the latter and the extent of both, this is clearly not a simple occupation site featuring a large population. Rather it is much more effective to understand sites like Ntuusi as focal points in the landscape, which accrue and develop status and significance, both politically and religiously, and hence encourage repeated settlement. Therefore, such sites need to be understood as active locations which provided a perpetual focus for the mobile and transient world around. This emphasis then helps to understand the nature of the site at Bigo, encompassing a vast area, but with a very small population. Both Ntuusi and Bigo remind us that there are other very different settlement trajectories than those conventionally encountered in the classic centers of urban archaeology.

Reid, David (University of Illinois at Chicago), Patrick Ryan Williams (Chicago Field Museum) and Donna Nash (UNC-Greensboro)

[170] *The Role of Infrastructure in Wari State-Making in Southern Peru*

In southern Peru, the transition from the Early Intermediate to the Middle Horizon during the seventh century AD was marked by the expansion of Wari state colonists and influence from the Ayacucho heartland. Andeanists have long postulated the role of climate change and drought during this initial state expansion, while issues of chronology complicate this issue. Here, we reevaluate the radiocarbon data from the early Wari colonies of Cerros Baúl and Mejía in the upper Moquegua Valley in comparison to recent investigations of Middle Horizon roads and waystations that connected Peru's southern coastal valleys. We investigate how systems of infrastructure (i.e., irrigation canals, agricultural terraces, and road networks) integrated local Early Intermediate social groups within the processes of Wari state-making on the southern frontier. Furthermore, we argue that these systems of infrastructure are crucially important when considering processes of cultural resilience during periods of environmental and social stress.

Reid, Kenneth (Idaho State Historical Society) and Franklin Foit, Jr. (Washington State University)

[226] *The Western Stemmed Tradition and the Glacier Peak Eruptions: A Precautionary Tale*

Recent reviews of the radiocarbon record for Western Stemmed components on the Columbia Plateau suggest a post-Clovis age for this tradition. Controversies over the timing question are intensified by highly selective frames of references for mapping regional patterns of site distribution. Some sites are highlighted, other relevant sites ignored, and still others find their way into the debate through uncritical confirmation bias. This paper focuses on the latter confusion, examining the use of Glacier Peak tephra to establish terminus post quem Clovis or pre-Clovis ages for Western Stemmed components at the Spalding site on the lower Clearwater River, and Pilcher Creek in the Blue Mountains. The tephra identifications at both sites rest on personal communications from the same analyst/laboratory, but without supporting glass chemistry data. Subsequent reanalysis of the Spalding tephra identified it as redeposited Mazama. Potential misidentification of its nominal counterpart at Pilcher Creek encourages a second look there as well. If it is Glacier Peak rather than Mazama, the thickness of the deposit and its downslope position are consistent with a secondary rather than primary deposit. To date there is no convincing evidence of contemporaneity between the Western Stemmed tradition and primary Glacier Peak B/G eruptions.

Reid, Rachel [154] see Goldstein, Steven

Reifschneider, Meredith (Stanford University)

[348] *Scale in Health-Related Research: Situating Topographies of Health Care*

The social production of scale in archaeology has figured prominently in research that aims to develop understandings of local, regional, national, and global processes by tacking between various scalar modalities. Oftentimes, "the global" is posited as the causal and ultimate force, relegating "the local" to the status of a case study. Within social science research more broadly, conceptualizations of scale have increasingly undergone complex formulations in order to address political processes of connectivity. In this paper, I argue for discarding binary, hierarchically organized global/local approaches in lieu of focusing on specific sites of action and social production. This paper addresses the social politics of medicine in the context of enslavement in the former Danish West Indies. Understandings of health and health care practices in the Danish colonies were not the local instantiation or reterritorialization of global attitudes, but were sites of intimate relations between bodies, objects, and orders. This research seeks to historicize present baselines of normalcy in health discourse by reframing health as a dynamic and complex process. By refocusing on specific sites of social life, researchers gain theoretical and methodological purchase on how ideas are formed, how actions are produced, and how relations are generated and maintained.

Reilly, Frank (Texas State University) and Sean McClure (Texas State University)

[80] *The Liminal Space between Night and Day in the Mesoamerican Formative Period*

Iconographic investigations have revealed how the spread of the symbolism associated with NIGHT and DAY and the liminal space that separates the two were the major focus for the layout of sacred space or ritual precincts throughout the Mesoamerican Formative Period. Night was perceived as the home of much of the spiritual power which the ancient Mesoamericans perceived as inherent within the cosmological structure of the cosmos. In order to control the public and supernatural interface of this religious understanding, the division between day and night became the most significant ritual focus of ancient Formative Period religious rituals.

Reilly, Sophie (McMaster University)

[232] *Plants in Ancient Pots: A Comparative Study of Paleoethnobotanical Results from Unwashed and Washed Ceramics*

Paleoethnobotanists study human-plant interactions in the past, including the role of plants in ancient foodways. Microbotanical remains (phytoliths and starch grains) enable the identification of many plants because their morphology can be diagnostic to the family, genus, and species. Microbotanical samples can be extracted from specific artifacts, such as ceramics, enabling a better understanding of their use. Paleoethnobotanists can thus discern associations between certain vessel types and plant remains, and begin to understand the presentation and consumption of ancient meals. Unwashed artifacts are ideal in such studies, as they increase the likelihood of recovering microbotanical residues and mitigate the risk of contamination. However,

not all archaeological projects keep samples of unwashed artifacts for future research. This poster presents comparative results from unwashed, washed, and charred ceramic sherds from the Late Formative (200 BC–AD 400) sites of Kala Uyuni and Challapata in the Lake Titicaca basin of Bolivia. I compare the utility of microbotanical results obtained from each of these kinds of sherds and consider whether carrying out analysis on washed or charred sherds is a viable alternative when it is impossible to access unwashed sherds.

Reilly, Sophie [22] see Bérubé, Éloi

Reimer, Paula [237] see Katzenberg, Mary A.

Reimer, Rudy

[334] A Squamish Nation/Coast Salish Sense of Time

The foundation of understanding time and the past lays in the realm of constructing cultural historical chronologies through the use of radiocarbon dating and the determination of temporally sensitive artifacts. Along the shores of the Salish Sea of the southern Northwest Coast of North America the long established cultural historical sequence has been questioned and critiqued for its utility in modern day archaeological frameworks. Yet, the foundation of many regional interpretations regarding changes in lithic technology, subsistence and cultural complexity still rely on an entrenched sense of time from a western scientific perspective. While useful, regional researchers need to broaden the understanding of the past. This paper presents an Indigenous view of the past through the lens of Squamish Nation oral history, archaeology and the paleoenvironmental record. It offers an alternative sense of time that is culturally meaningful and pushes regional research to consider this perspective as a means of decolonizing the past, present, and future for Indigenous communities.

[216] Chair

Reindel, Markus [156] see Fecher, Franziska

Reindel, Markus (German Archaeological Institute, Bonn, Germany), Franziska Fecher (German Archaeological Institute, Bonn, Germany) and Peter Fux (Museum Rietberg Zürich, Switzerland)

[326] New Investigations on the Northeast Coast of Honduras

As part of the Central American Isthmus, Honduras adopted a special role in prehispanic America. Together with Nicaragua, the territory of modern Honduras functioned as a bridge between the culture areas of Mesoamerica and the Intermediate Area. In spite of that unique situation, archaeological investigations in Honduras have been focusing on the western, Mesoamerican part, especially on the Maya city of Copan. In contrast, cultural developments in the east remain largely unknown. With the goal to enlarge the data base about the settlement history and cultural developments of that zone, archaeological excavations were realized for the first time in Guadalupe, near Trujillo, on the northeast coast of Honduras. The first excavation campaign revealed an extended settlement with a central platform, dating in the upper layers to the late Postclassic Period (Cocal). The unexpected abundance of artifacts (ceramics, obsidian, shell, greenstone, etc.) will allow to refine the existing artifact typologies and chronologies. These first results permit preliminary ideas about the characteristics of archaeological sites in that region and about their relations within an interregional exchange network.

Reinhard, Karl (University of Nebraska–Lincoln), Luz Ramirez de Bryson (University of Nebraska–Lincoln), Nicole Searcey (University of Nebraska Medical Center), Isabel Teixeira-Santos (University of Nebraska–Lincoln) and Calogero M. Santoro (Instituto de Alta Investigación, Universidad de Ta)

[143] Human Coprolite Diet Reconstruction Confirms Wetland Resource Use in the Coast of the Atacama Desert, 6580 cal. yr BP

It has been proposed that Chinchorro coastal people along the Atacama Desert in northern Chile had marginal access to plant food, a position refuted by recent scholars. The older perspective comes from bone chemistry analyses which showed a nearly exclusive reliance on marine animal resources. Newer analyses of mummy gut contents shows a substantial reliance on wetland plant resources, especially sedge rhizomes and seeds. Therefore, existing analyses present very different ideas of Chinchorro diet. We undertook the analysis of 16 coprolites from two Chinchorro sites. The analysis of pollen from these sites demonstrates two further uses of different plant communities beyond sedge wetlands. At one site, polleniferous cattail flower heads were eaten. The second site shows an exploitation of desert scrublands where mesquite, acacia and goosefoot were available. These data expand our knowledge of Chinchorro use of wetland and dryland plant communities.

Reinhardt, Eduard [22] see Fletcher, Beatrice

Reinhart, Katrinka (Stanford University)

[72] Daily Life and Ritual at Yanshi Shangcheng: Subterranean Deposition and the Puzzle of Blended Deposits

At the early Bronze Age city of Yanshi Shangcheng (Henan, China), an important aspect of the lifeways of residents was the practice of depositing various sorts of materials underground. Pottery, human and animal bodies, implements, ornaments, and other materials were deposited in pits, wells, ditches, and graves. These “depositional practices” resulted in a bounty for future archaeologists. However, deposition has been undertheorized in Chinese archaeology. Depositional features are often uncritically assigned to categories such as “ash pit” or “sacrificial pit” (ordinary versus special deposits). In this paper, I investigated deposition in two areas of the Yanshi Shangcheng site, a walled elite area and an artisan residential/work area. In this presentation, I will illustrate that some depositional features defy neat identifications, problematizing categorization that assumes a universal definition of “refuse” and that separates ritual and daily life into two distinct spheres of practice. I will question whether a mundane/ritual dichotomy is appropriate for understanding early Bronze Age life in northern China. I also considered archaeological methods (excavation, recording, reporting, and analysis) if to enable a more critical approach to daily life and ritual in the early Bronze Age of northern China.

Reinhold, Sabine (Eurasia-Department DAI)

[221] Late Bronze Age in the North Caucasus: Shaping a New Culture for a New Millennium

After more than one millennium of mobile pastoral lifeways, the mid-second millennium BC witnessed the reappearance of village-based life in an area stretching from the Black Sea, across Caucasia to Anatolia and North Western Iran. Its manifestation is the emergence of stone-built dwellings clustered in small or middle-sized settlements. Concurrently, the transformation of the third millennium BC mobile pastoralism into combined mountain agriculture allowed retaining a pastoral economy in spite of a stationary lifeway for another 600 or 700 years. A German-Russian cooperation project investigated more than 280 sites in the Northern Caucasus (Russia) that reflect the formation of the new settlement system using an integrated spectrum of

multidisciplinary research methods. As a result, we can today draw a first picture on the formation and the transformation of the Late Bronze Age in the Northern Caucasus, a period before nearly unknown due to fact that sites in the lowlands are missing. This epoch sees a new mountain based culture that incorporates local groups as well as shifting populations from the steppe region. This overview will present the first draft of the chronological, economic and social developments that shaped this new cultural phenomenon in the second millennium BC.

Reitsema, Laurie [223] see Garland, Carey

Reitz, Elizabeth (University of Georgia)
[85] *Discussant*

Reitze, William (University of Arizona)

[304] *Building on an Archaeological Record: Preliminary Results of the Three-Year Petrified Forest Boundary Expansion Survey*
In 2004 Congress authorized Petrified Forest National Park to more than double in size, in part to protect unique cultural resources. This poster introduces the preliminary results of three seasons of pedestrian survey in these new lands. So far this research has recorded archaeological resources dating across the spectrum of the human habitation of North America, beginning with Paleoindian lithics and extending through the historic period. Sites ranging from lithic landscapes covering hundreds of acres to masonry structures with dozens of rooms are spread across the grassland landscapes of Petrified Forest. Mapping in semi-stabilized dunes has focused on large Basketmaker village sites and detailed ceramic analysis has documented phenomenal diversity of ceramic types and sources. Large-scale, systematic pedestrian survey has been conducted across a variety of landscapes to better understand how prehistoric people used the variation in environments and resources across the park through time. In addition to the boundary expansion work, this past season park archaeologists worked in the pre-2004 core of the park to better contextualize previous research with the archaeology in the expansion lands. To date, this program has also provided 20 college student interns with in-depth field training and independent research opportunities.

[304] *Chair*

Reitze, William [304] see Erickson, Katrina

Ren, Xiaoyan [78] see Zhang, Dongju

Rendu, William (CNRS—NYU), Morgan Roussel (Leiden University), Sylvain Renou (Université Bordeaux), Marie Cecile Soulier (CNRS-Université Toulouse Jean Jaures) and Marie Soressi (Leiden University)

[169] *Les Cottés Sequence: A New Lens for Investigating the Cultural Changes Occurring during the Middle to the Upper Paleolithic Transition*
During the transition from the Middle to the Upper Paleolithic in Europe, the replacement of Neanderthal populations by Anatomically Modern Human ones is concomitant of major cultural transformations. Progressively, human population incorporated new raw materials in their personal gear cumulating into an explosion of the cultural material diversity. Les Cottés in France preserves a detailed sequence with levels attributed to the late Mousterian, Chatelperronian, ProtoAurignacian and Early Aurignacian. Through combined zooarchaeological and lithic technology approaches we investigate how the need for new raw material extracted from mammals' body impacted the lithic tools production. Our results underline a strong interaction between needs and technological production. They also suggest that the changes we observed are related to major changes through time in how and for what for the site was used. Thus it is not only the technology that was impacted by the development of these new needs, but also the logistic organization of the society itself.

Rengifo, Carlos [170] see Uceda, Santiago

Rennaker, Patrick W. (Portland State University) and Virginia L. Butler (Portland State University)

[228] *How Were Pacific Cod at Tse-whit-zen Affected by Climate Change?*

In 2011, U.S. federal agencies listed Pacific cod (*Gadus macrocephalus*) in the Salish Sea as a species of concern. Fishery managers typically use historical data from the past ~ 50 years to create baselines to manage reduced fisheries, which does not take into account long term environmental change or how human populations have affected the ecosystem in the past. Archaeological data extends these baselines much further back in time. The Tse-whit-zen faunal project provides a ~ 2,200-year history of indigenous fisheries for one part of the Salish Sea and thus presents a unique opportunity to address questions relevant to current management. Measurements of the quadrate, premaxilla and abdominal vertebrae were used to reconstruct body size; and taxonomic abundance provides a crude estimate of changing fish abundance, that were compared to predictions from changing sea surface temperature linked to the Medieval Climatic Anomaly and the Little Ice Age or overfishing. Minor fluctuations in size over time were seen, but these are not linked to known climate trends. Cod abundance decreases during the Medieval Climatic Anomaly and increases after the Little Ice Age, which is consistent with predicted response. Impacts from exploitation pressure are not evident.

Rennie, Patrick J. [307] see Wilson, Michael

Renou, Sylvain [169] see Rendu, William

Renteria, Rebecca (University of Arizona Tree-Ring Lab) and Ronald Towner (University of Arizona Tree-Ring Lab)

[188] *Homesteading in Cebolla Canyon, New Mexico: Ethnicity Studies in Using Dendrochronology, Historical Documents, and Oral Histories*
Cebolla Canyon, in the El Malpais National Conservation Area, New Mexico, was homesteaded extensively in the late eighteenth and early nineteenth centuries by Hispanic and Euro-American families. The local environment provided grazing resources for sheep and cows, and the ability to homestead in this area allowed families to pursue seasonal or year-round occupation. The regional histories of these migrants differ, but the exploitation possibilities of land and timber provided people with the promise of land ownership and sustainability with respect to their necessities and desires; these are strongly based on sociopolitical factors of the time. Focus here is on Hispanic and Euro-American homesteading sites, comparatively. Using dendrochronology we can provide target dates for felling events, and in combination with archaeological remains we can grasp the duration of occupation for homesteading sites. We can also identify methods in which ethnicity can be delineated in the historical archaeology record. Further insight is provided by historical

documents, such as census records and homesteading patents that can give us an idea of how people institutionally- or self-identified as an ethnic group. Further, we can see how migrant groups were perceived by others by incorporating the use of oral histories.

[188] *Chair*

Respass, Amanda [199] see Niziolek, Lisa

Reti, Joseph [303] see Babala, Peter

Reuther, Joshua [47] see Lanoë, François

Reyes, Omar (CEHA, Instituto de la Patagonia, UMAG), César Méndez (Departamento Antropología, Facultad Ciencias Social), Manuel J. San Román (CEHA, Instituto de la Patagonia, UMAG) and Camilo Robles

[32] *The Chonos Archipelago: From Hunting-Gathering to Industrial Productivity in the Western Patagonian Channels (43°50'–46°50' S), Chile*
The Chonos archipelago is a series of islands and fjords in the northernmost part of western Patagonia, South America. It has been disconnected from continental landforms since glacial retreat, thus it is an ideal area for assessing the human use of maritime habitats. We analyze the spatial and temporal distribution of the archaeological record focusing on the emergence of human intense signatures in the last part of the late Holocene. The archaeological record (87 sites) includes open-air and within cave shell-middens, collective burials inside rockshelters, fishing pens, and historical camps. The radiocarbon record (90 dates) is discontinuous since the first evidence at 6300 cal BP until a recurrent occupation at 2000 cal BP, being particularly strong during the last millennium. Historical records from the Chonos peoples disappeared by the XVIII century and the archipelago became the territory for extractive activities (whalers, industrial shellfish processing, wood extraction) leaving traces in the shoreline. Today, the archipelago is used intensively, but productive activities (pisciculture) occupy marine surfaces, thus diminishing the production of materials on the coast. Assessing the continuous record of fully maritime societies should prove useful for understanding broader pictures including the variability in human signatures during the Anthropocene. FONDECYT #1130151.

Reyes Truque, Javier [349] see Domínguez, María del

Reynen, Wendy

[374] *New Insights into the Dynamics of Human Behavior during the Last Glacial Maximum and Terminal Pleistocene in the Pilbara, Northwest Australia*

The emerging picture from the Australian archaeological record shows a varied pattern of human responses to the environmental and climatic fluctuations that characterized the Last Glacial Maximum (LGM) and the terminal Pleistocene in arid Australia. Archaeological data suggests a decline in site use and reorganization of human landscape use in correlation to broad shifts in climate and environment. The nature of these changes is complex and requires unpacking on a high-resolution scale as it is likely that localized environmental fluctuations strongly influenced mobility and occupation patterns. However, only 11 Australian arid zone sites have unequivocal evidence for LGM occupation and few sites have detailed published analyses of cultural material to understand the nature of Aboriginal occupation at this time. A case study from arid northwest Australia provides a fresh insight into the human-environment relationship and human behavior during the Pleistocene. Material assemblages from several recently excavated rockshelters are analyzed to provide a high-resolution narrative of Aboriginal rockshelter use and occupation during the LGM and post-LGM Pleistocene period.

Reynolds, Sidney (University of Georgia), Jonathan S. Reeves (George Washington University), Matthew Douglass (University of Nebraska–Lincoln) and David R. Braun (George Washington University)

[153] *Hominin Land Use of and Movement in the Koobi Fora Formation (Kenya)*

The occurrence of large densities of lithic and fossil material in Early Pleistocene contexts have been the focus of much interest. Several hypotheses modeling hominin foraging strategies have been generated to explain their formation. Assemblage formation is often hypothesized to be the result of particular land use strategies that relate to the movement and discard of stone artifacts. These hypotheses are difficult to test because they rely on ethnographic models of human movement, yet they are applied to assemblages that reflect millennia of time averaged behaviors. Assemblage level measures such as the volume ratio, cortex ratio, and flake to core ratios are useful tools for quantifying the movement of different components of lithic assemblages largely because they require a time averaged signal to describe patterns of movement in hominin behavior. To quantitatively test these hypotheses, we generate theoretically grounded expectations for these assemblage level measures in the context of various foraging strategies. We apply these measures across a series of Early Pleistocene archaeological localities in the Okote Member (1.6–1.39 Ma) of the Koobi Fora Formation to test these hypotheses against this archaeological record. This research was supported by the NSF International Research Experience for Students (OISE-1358178 and 1358200).

Reynon, Brandon

[361] *Discussant*

Rhode, David (Desert Research Institute)

[339] *The Promontory Caves Plant Macrofossil Record*

The dry deposits in Promontory Caves #1 and #2, northern Utah, contain abundant well-preserved plant materials related to the late prehistoric occupations there. Much of the plant macrofossil record in both caves, especially Cave #1, represents the manufacture of textiles, in particular the production of bulrush matting. Plant remains attributable to dietary use constitute a small part of the overall assemblage, consistent with the negligible evidence of plant food processing such as milling equipment. Here I consider the place of plant utilization in the Promontory Caves occupations, and potential indications of cultural connections with proto-Apachean populations and with local Great Basin societies such as the Fremont.

Rice, Sally (Department of Linguistics), Conor Snoek (Department of Linguistics, University of Alberta) and Michaela Stang (Humanities Computing/School of Library Studies)

[339] *Linguistic Relationships between the Apachean Subgroup and Northern Athapaskan*

Linguistic evidence has long played an important role in determining the relationship of Apachean peoples to Northern Athapaskans (Sapir 1936). While Apachean membership within the larger Athapaskan family is firmly established, the more precise determination of their linguistic affiliation to Northern

Athapaskan linguistic groups has proved more difficult (Rice 2012). The reasons for this difficulty arose chiefly from the lack of available data and the limitations in the power of analytic methods employed. Recent scholarship has led to improved availability and quality of lexical source materials for Athapaskan. Lexical comparison, the cornerstone of historical linguistic research, can now be carried out on more wide-ranging and disparate data. Methodologically, comparative linguistics has developed to a stage where reliable methods for the investigation of historical linguistic relationships have become established, especially in the fields of dialectometry (Nerbonne et al. 2011) and phylogenetic linguistics (Greenhill and Gray 2009). In this paper, we apply these quantitative methods to lexical data compiled in the Pan-Athapaskan Comparative Lexicon, a database containing over 20,000 words from the terminological domains of anatomy, kinship, fauna/fish/insects, flora, landscape, and gaming, among others. We compare the results of our analyses with existing hypotheses concerning the closest linguistic relatives of the Apacheans.

Rice, Shaelyn (University of Calgary), Geoffrey McCafferty (University of Calgary), Sharisse McCafferty and Dieuwertje van Boekel

[326] *The 2016 Season at El Rayo, Nicaragua: Civic-Ceremonial Structures, Tombs, and Feasting from the Bagaces to Sapoa Transition*
Expanding on prior field seasons, the 2016 field school at El Rayo, with the support of the Institute for Field Research, continued the exploration of the unique Bagaces to Sapoa transition period site, located on the Asese Peninsula, Lake Nicaragua. This season focused on the excavation of four loci, continuing to explore previous questions regarding cultural activities in Pacific Nicaragua. Loci 2 and 4, which had been studied in previous field seasons were expanded, while new Loci 6 and 7 were opened. Highlighting this season's findings were the continuation of Locus 4 large civic-ceremonial structure, located near to a structure at Locus 6 and Locus 7. Locus 7 also features an intriguing double burial, which was unfortunately looted in antiquity. Finally, the deep excavations at Locus 2 revealed multicomponent domestic trash deposits from the Sapoa period, superseding the deep layer of Bagaces period cultural material. Preliminary vessel form analysis of the Bagaces ceramics, in relation with the faunal assemblage, indicated probable short term consumption such as feasting activities. With each new field season, El Rayo continues to reveal more unexpected and unique site characteristics, displaying valuable data relating to Pacific Nicaraguan ceremonial and domestic activities.

Rich, Carrin [273] see Arazi-Coombs, Sandra

Rich, Michelle (Los Angeles County Museum of Art, Art of the Ancient Americas)

[392] *Beyond Polychrome and Greenstone: FTIR and SEM-XEDS Analysis of Fine-Grained Remains from Two Ancient Maya Royal Tombs at El Perú-Waka'*

Ample evidence suggests Classic period Maya royal tombs were intentional arrangements of symbolically-charged objects and offerings. Because of this, critical examination of the entire array of a tomb's contents is vital. Analysis of polychrome vessels, greenstone jewels, and human remains are certainly essential. Relative to these more well-preserved or spectacular components of a mortuary assemblage, small-scale or fine-grained remains have historically tended to be understudied or overlooked, yet provide important clues about other integral elements of elaborate burial tableaux. This paper presents results of FTIR and SEM-XEDS analysis of a variety of pigment, residue, and matrix samples from royal Burials 24 and 39 at El Perú-Waka', Petén, Guatemala. Specifically, results of these analyses permit fuller appreciation of the gamut of objects, materials, and substances utilized or incorporated in the interment of Maya elites. More broadly, these data enhance contemporary comprehension of the potential range of uses for specific materials and substances, both organic and inorganic, by ancient Maya people.

Richards, John (University of Wisconsin-Milwaukee), Robert C. Mainfort Jr. and Seth A. Schneider

[341] *Comparative Compositional Analysis of Parkin Phase Red-slipped Pottery and Red Ochre Deposits Using pXRF and Petrography*
Portable X-ray fluorescence (pXRF) was used in conjunction with petrographic analysis of ceramic thin sections to characterize a sample of red-slipped potsherds from selected late Mississippian sites in northeast Arkansas. Data from this analysis is compared to a similar characterization of two separate hematite rich deposits from the same region. Results are used to evaluate the potential of this type of analysis to distinguish ochre sources from one another and to identify deposits that were used as constituents of ceramic slips.

Richards, Julian (University of York Archaeology Data Service)

[227] *Size Isn't Everything: Are Our Data Good Enough to Be Big?*

Archaeological data may not yet meet the criteria for Big Data, but the growth of archaeological cyber-infrastructure is providing the foundations for "big data" research. Using digital repositories such as the ADS in the UK and tDAR in the USA, we have access to millions of records, from multiple resources. Data and text mining tools allow us to extract information from published and unpublished fieldwork reports, while the ability to create Linked Open Data or to integrate metadata via portals such as ARIADNE in Europe and DINAA in North America should allow us to break free from individual data silos. Nonetheless, the idea that "big data" somehow carries an aura of truth, objectivity, and accuracy through size alone has been identified as a myth. This presentation will underline the importance of adequate metadata, and data standards, in allowing us to integrate disparate data resources and to employ "big data" methodologies. It will consider the strategies adopted by recent projects that have sought to combine massive datasets to provide archaeological synthesis, and review their success.

[149] *Discussant*

Richards, Katie (Washington State University)

[368] *Evaluating and Reevaluating the Importance of Cacao, Nicotine, and Macrobotanicals at Alkali Ridge Site 13, an Early Pueblo I Site in Southeast Utah*

Alkali Ridge Site 13 is one of the largest and earliest Pueblo I sites ever found in the American Southwest. Located in southeast Utah, the site was originally excavated by J. O. Brew in the early 1930s. Brew's final site report includes brief descriptions of most major artifact types found at the site, but largely ignores the abundant botanical remains discovered there. Even though little research has been conducted on the macrobotanical remains, recent residue studies on pottery have shown surprising evidence for cacao at this early site. Recent excavations and re-excavations at Site 13 in 2012 and 2013 have provided new and better controlled datasets from which to study plant use. While maize was by far the most dominant botanical material recovered from the site, other charred remains as well as residues from a variety of ceramic types have helped us gain a broader understanding of what plant materials were and were not commonly used at this important Pueblo I site.

Richards, Michael P. [50] see Diaz, Alejandra

Richards, Patricia (University of Wisconsin-Milwaukee)

[341] *Challenges to the Wisconsin Burial Sites Preservation Statute (WisStats 157.70)*

The 1987 Wisconsin Burial Site Preservation Statute (WisStats 157.70) serves as the basis for the protection of all burial sites in the state of Wisconsin and assures that all human burial sites be accorded equal treatment under the law regardless of age or affiliation. Recently, challenges to the law have taken the form of an introduced bill (LBR 2890—eventually withdrawn), and the convening of a Wisconsin Legislative Study Committee of the Preservation of Burial Sites. This committee is charged with reviewing the present law in the context of landowner rights and includes land developers, real estate lawyers and legislators. This poster summarizes suggested changes to the law, and presents the results of three burial site excavations in Milwaukee County, Wisconsin, as case studies of the law in practice. The burial sites presented are the Old Catholic Cemetery (47 MI-0254), the Milwaukee County Poor Farm Cemetery-Froedtert Tract (47 MI-0527), and the Second Ward or Gruenhagen Cemetery (47 MI-0523).

Richardson, Lorna-Jane (Umeå University, Sweden)

[37] *Thinking Socially: Digital Archaeology beyond Technological Fetishism*

As research momentum gathers alongside the adoption of digital technologies into everyday life, the terms “virtual reality,” “online,” and “cyberspace,” increasingly fail to recognize the degree to which the adoption of digital technologies, and the material objects through which the digital is accessed, have been domesticated and made normal. The entanglement of social communication networks in the variety of digital environments provided by archaeological organizations is often seen as peripheral to digital archaeology, which is absorbed in technical applications and data analysis, or simple, ephemeral communications, in the case of social media. The social contexts, platforms, and technologies involved in digital archaeology have, on the whole, been under-explored and under-critiqued, and have, as Huggett argues, “left archaeologists open to accusations of technological fetishism” (Huggett 2015:87). This paper will attempt to address these concerns by reasserting the relevance of sociological theory to the contemporary human condition, and anticipate future social and technological trajectories, which may impact our practice.

Richards-Rissetto, Heather (University of Nebraska-Lincoln)

[18] *A Course on “Digital Heritage Tools”: A Reflexive, Engaging, and Ever-Changing Pedagogical Experience*

Digital Heritage . . . ? A definition could be “the valuing, protection, documentation, and understanding of humanity’s shared heritage through the application of digital tools, media, and digitally-enabled spaces.” The take-away—Digital Heritage is a big concept. As scholars and educators making use of digital tools and methods, we face challenges of big data, rapidly changing technology, proprietary vs. open source, and the list goes on. Yet, increasing use of technology necessitates that we teach the digital. For three years, I have taught a course on “Digital Heritage Tools”—a course that serves not only anthropology but also English, history, and other disciplines. Given the broad definition of heritage and the diverse student audience, course development has been challenging, eye-opening, and energizing. This paper describes a morphing course on digital heritage—speaking to successes and ongoing challenges, particularly focusing on balancing teaching critical analysis alongside technological skills. Course topics include design and usability, web technologies, preservation and access, analysis and visualization (e.g., GIS, 3D modeling), and relevance of digital technologies in heritage interpretation, education, tourism, and outreach. Students carry out individual or collaborative semester projects to gain hands-on experience with not only technology, but importantly, digital storytelling to reflexively engage with heritage.

[312] *Moderator*

Richards-Rissetto, Heather [130] see Wills, Chip

Richey, Kate (University of Calgary Undergraduate) and Geoffrey McCafferty (Professor, Department of Archaeology University of)

[9] *The Function of Candeleros and the Enigmatic Relationship between Teotihuacán and Honduras*

The ceramic vessel known as Candeleros, which is commonly associated with Teotihuacán, is problematic for several reasons. Candeleros are generally small ovoid vessels with one or more chambers, often associated with domestic use and believed to be a type of incense burner. However, residue analysis that has been conducted to date does not always find materials associated with burning. Candeleros are most often associated with Teotihuacán, but are also found in Northern Honduras at sights such as Copan. Why Candeleros are commonly found in these two geographically distant areas and at a much lower concentration in between these two sites is unclear. This project uses residue analysis from a sample of Candeleros from Teotihuacán to shed light on the function of Candeleros as well as discussing the possible relationship between Teotihuacán and Northern Honduras.

Richter, Kim (Getty Research Institute)

[94] *The Tamtoc Scroll Style: Assessing the Relationship between the Huasteca and Classic Veracruz*

What were the Huastec region’s interregional relations during the precolumbian period? This is one of the pressing questions about the Huasteca that archaeologists, linguists, and art historians have tried to tackle since the nineteenth century. Scholars have identified cultural relations with the southeastern United States, central Veracruz, central Mexico, west Mexico, and the Maya region. Yet, the archaeological data supporting these identifications are sparse because few scientific long-term excavations have been carried out in the Huasteca. Recent excavations at the site of Tamtoc, one of the major and most extensively excavated sites in southern San Luis Potosí, however, have shed new light on this question. Monumental sculptures in particular have yielded stylistic and iconographic details, such as interlaced scroll designs, that indicate links to central Veracruz during the Classic period. This paper establishes that Tamtoc sculptures present a local variant of the Classic Veracruz style as defined by Tatiana Prokouriakoff (1953, 1954), while also maintaining a distinctively Huastec identity. This analysis of the sculptural evidence from Tamtoc sheds new light on the relationship between the Huasteca and Classic Veracruz and redresses the frequent omission of the Huastec region in discussions about cultural interactions along the Gulf Coast.

Richter, Tobias [95] see Ramsey, Monica

Rick, Torben [32] see Erlandson, Jon

Ridge, William (University of Illinois at Chicago)

[234] *On We Sweep with Threshing Oar: Interaction Networks in Aegean Prehistory*

Prior to the introduction of sailing technology during the third millennium BCE, communication and movement throughout the Aegean Basin was greatly shaped by the region’s mixed landscape of open sea, island clusters, and mountainous interiors. Modeling the physical landscape and accounting for travel rates and physical restrictions to travel over both land and sea, I examine the nature of movement across the Aegean during the Neolithic and Early Bronze Age (6500–2000 BCE). Based on these variables, I use techniques and approaches from GIS and network analysis to model how social interaction between the various subregions (e.g., the Cyclades, Thessaly, Crete) took place and changed over time. I relate these models back to the

archaeological trajectory of the region and explore how patterns of large-scale interaction may have influenced changes in demographics and social organization at the regional and local levels.

Riede, Felix (Dept. of Archaeology, Aarhus University) and Russel Blong (Macquarie University)

[77] *Can Archaeology Provide an Evidence Base for Realistic Disaster Scenarios That Contribute to Reducing Vulnerability?*

Extreme climatic events and natural disasters often have a recurrence periodicity beyond that of ethnographic, sociological and, at times, even historical investigation. In a deep historical perspective focused on geo-cultural heritage, however, human communities have been affected by numerous kinds of natural disasters that may provide useful data for scenario-based risk reduction management vis-à-vis future calamities. Using selected past volcanic eruptions as examples and merging Lee Clarke's sociological argument for "possibilistic thinking" and David Staley's notion of "historical thinking" with a concern for contemporary and future resilience, this paper suggests that such comparative, cross-cultural "paleosocial" information on the constellations of vulnerability and resilience pertinent to deep-time disasters can be employed usefully in Realistic Disaster Scenarios (RDSs).

[148] *Moderator*

Riehl-Fitzsimmons, Belinda, Tomasin Playford (Saskatchewan Archaeological Society) and Karin Steuber (Saskatchewan Archaeological Society)

[122] *The SAS ArchaeoCaravan-Museums Program: Archaeology and the Public in Saskatchewan*

The ArchaeoCaravan-Museum Program brings archaeology and history alive in the province of Saskatchewan. The Saskatchewan Archaeological Society spent the past five years visiting community museums with our mobile activity center to educate and inform the public about our rich and diverse archaeological heritage. In total, we visited 107 museums (in 11 museum networks), 102 communities, and reached over 10,000 people of all ages. At the same time, we were able to view museum collections that may not be well-known in the archaeological community. In 2013, we were chosen as a finalist in the Governor General's History Award for Community Programming. This award is part of a series administered by Canada's History Society that celebrates the best achievements in Canadian heritage and history. This presentation will discuss the successes and challenges of this award-winning program, how it developed and evolved over the past five years and where we go from here.

Riel-Salvatore, Julien (Université de Montréal), Fabio Negrino (Università di Genova), Marco Peresani (Università di Ferrara), Martina Parise (Università di Genova) and Jamie Hodgkins (University of Colorado Denver)

[389] *Characterizing Ephemeral Paleolithic Occupations at Arma Veirana (Liguria, Italy)*

This paper presents a description of recently studied assemblages from Middle and Upper Paleolithic levels at the site of Arma Veirana, a large cave located in the mountainous hinterland of Liguria. While one Mousterian level shows an intense occupation, all other levels indicate rather short-lived, low intensity occupations. Beyond technological and typological analyses of these assemblages undertaken to characterize them, we also report preliminary data on raw material procurement patterns from these levels. While the Mousterian suggests predominantly local acquisition, the Upper Paleolithic is comprised mainly of exotic lithotypes. Beyond these results that largely agree with received wisdom about the technology and mobility strategies of the two periods, we also discuss the presence of a distinctive reddish radiolarite in some of the assemblages from both periods. This material has historically been considered exotic, raising a number of questions about how local and exotic materials contributed to the tool kits of foragers during their comparatively ephemeral occupations of the site. Lastly, we tackle the question of what these results mean for our understanding of Ligurian prehistory more broadly, since it has almost exclusively focused on coastal as opposed to inland sites.

Riel-Salvatore, Julien [85] see Pothier Bouchard, Genevieve

Rieth, Timothy (IARL) and Derek Hamilton (University of Glasgow, SUERC Radiocarbon Dating La)

[180] *Quantifying the Number of ¹⁴C Determinations Required to Improve Dating Accuracy for Lapita Deposits*

The use of radiocarbon dating to calculate the dates of Lapita deposits remains largely a single-step, ad hoc procedure. The accuracy of dating results can be greatly improved through Bayesian modeling. However, this depends on the number and stratigraphic distribution of radiocarbon determinations and the shape of the calibration curve. To evaluate these issues, we used Oxcal 4.2 to simulate, through the process of back-calibration, radiocarbon determinations that we could expect to receive as measurements on a series of samples of "known" Lapita dates in Remote Oceania. We then ran a series of Bayesian models in which the number of radiocarbon determinations was incrementally increased, stratigraphy altered, and temporal parameters varied. Because the radiocarbon determinations are based on "known" calendar dates we were able to evaluate when a particular Bayesian model provided results that were accurate and precise and at what point the addition of further age determinations did not affect the results. Our analyses demonstrate that dating of Lapita deposits must be approached as an iterative process, requiring a sampling strategy that allows for an assessment of redundancy in results that is indicative of a high degree of accuracy in the calibrated dates.

Rieth, Timothy [81] see Dye, Thomas

Riggs, Charles and Blythe Morrison (Northern Arizona University)

[122] *Holes in Student Education: Policy and Adequate Field Training in Contemporary Archaeology*

Despite the importance of Cultural Resource Management (CRM) in contemporary archaeology, the task of teaching students proper field techniques still largely falls on academic institutions in the form of summer archaeological field schools. Although CRM derives from numerous federal laws and policies, the same laws have made the conduct of field school increasingly difficult as federal, state and tribal land managers impose restrictions on the scope of excavations on lands that were once critical to academic field training operations. These changes have forced many academic programs to either limit their curriculum or have caused field schools to increasingly rely upon private land for field training purposes, often opening an entirely new Pandora's box of ethical concerns. We suggest that training within this limiting environment cannot adequately prepare students for the complex field situations they will encounter as they embark on careers in Cultural Resource Management.

Riggs, Erin (SUNY Binghamton)

[198] *Materializing Nationhood: The Many Roles of Built Landscape Management Policy in Post-Partition India and Pakistan*

This paper discusses built landscape management policies put in place during the aftermath of the 1947 Partition of India and Pakistan. It is argued that the management of out-migrant associated buildings (both monumental and residential) was influenced by three divergent goals of nationhood: 1) modernization, 2) secularism, and 3) cultural cohesion. These goals pointed toward conflicting actions. Providing shelter to millions of incoming refugees required the hasty allocation of dwelling spaces. Establishing a shared sense identity required repackaging built heritage as something commensurate with emergent understandings of national histories. Finally, upholding ideals of modernism and scientific objectivity required protecting architecturally

significant sites, regardless of their cultural origins. In this case, the diverse uses of built landscapes evidence the complexity of the relationship between nationalism and materials. Archaeological interpretations commonly focus on this relationship in terms of cultural symbolism and historic origins. However, materials also function as symbols of emergent, contemporary goals, investments, and identities. While materials can be leveraged as evidence of a nation's historic depth and cohesion, they can also be leveraged as evidence of associations in the present and future. Through discussion of this case, how archaeology might engage with broader understandings of materializations of nationhood is considered.

Riley, Jenny (Indiana University)

[69] *Results from a Bone Surface Modification Analysis of Sloth Bones from Padre Nuestro Cavern, Dominican Republic*

Between 2005 and 2010, scuba diving teams from the Indiana University Bloomington Center for Underwater Science performed surface collections of the entrance chamber to Padre Nuestro Cavern, a submerged freshwater limestone cavern located in the East National Park in the southeastern peninsula of the Dominican Republic. They extracted Chican ostionoid ceramics indicating use of the cave by the Taino culture (ca. AD 1000–1492), Casimiroid lithics indicative of the Archaic culture (ca. 6000–500 BC), and faunal remains including extinct sloth (*Parocnus serus*, *Acratocnus ye*, and *Neocnus* spp.), extinct platyrrhine monkey (*Antillothris bernensis*), and various other terrestrial and marine taxa. This paper will present the results of the faunal analysis and the methods used to analyze the bone surface modification located on many of the sloth bones, suggesting evidence for butchery of sloths by Archaic groups.

[69] *Chair*

Riley, Tim (Prehistoric Museum @ USU Eastern)

[104] *When Is a Pithouse a Pithome? Reconstructing a Fremont Household underneath the Book Cliffs of Utah*

Perched along the northern edge of the Colorado Plateau, the Tavaputs Plateau is best known among archaeologists for its interior canyons, including the incredible rock art in Nine Mile Canyon and the well-preserved Fremont communities located in Range Creek Canyon. Despite the greater water resources and arable land along the Book Cliffs escarpment of the plateau, it has received little professional attention. This research program focuses on a small segment along the Grassy Trail Creek, a formerly perennial stream with several village and single structure sites well-known to local collectors. This drainage serves as a gateway to both Nine Mile Canyon and Range Creek Canyon. Initial studies suggest that this drainage may be best considered as a dispersed community, although the lack of temporal data precludes any rigorous statements about occupational overlap between sites. Recent excavations at a site called the Martinez Pithouse have revealed a burnt and collapsed structure with an intact floor and associated assemblage. This excavation provides the first dates for the Fremont occupation of this drainage as well as an opportunity to examine the household structure of the people who called this place their home.

[104] *Chair*

Rinck, Brandy (SWCA Environmental Consultants)

[51] *Micromorphological Analysis of Thin Sections from Bear Creek (45KI839), Redmond, King County, Washington*

Micromorphology samples were collected during data recovery at the Bear Creek Site (45KI839) in Redmond, Washington in order to supplement the site's formation history. Micromorphological analysis of these samples has shed light on the taphonomic and sedimentary depositional processes at work prior to, during, and after Late Pleistocene-Holocene transition (LPH) occupation of 45KI839. This poster presents the micromorphology research design, sampling and analysis methodology, and results of analysis. The formation history of 45KI839 is marked by diastems. Several soil surfaces that represent periods of stability were identified in thin section, including a buried surface at the base of artifact-bearing Stratum V. In general, the buried surfaces show that the shifts to and from the depositional environment of human occupation were more gradual than the field observations suggested. The buried surfaces are separated by accumulations of sediment that represent periods of change. Although these sedimentary deposits are dominated by evidence for gradual accumulation, the 45KI839 stratigraphic profile also shows evidence for punctuated, event-driven deposition and erosion. In addition to site formation history information, petrographic analysis has also informed on internal site structure. The thin sections show vertical and horizontal variability within Stratum V and among Stratum V contacts throughout the site.

Ringelstein, Austin

[98] *When Smuggling Sailors Met the First Angelinos: Material Messages from Forgotten Santa Catalina Island, California*

A colonial archaeological assemblage from Santa Catalina Island, California contains both "traditional" native materials and substantial Euro-American trade goods. Archival sources and artifacts suggest that the native islanders, known as the Pimu Tongva people, opportunistically acquired trade goods from Euro-American seafarers for close to 300 years. Although the bulk of the trade items appear to be European in origin, recent insight suggests that some of the materials have associations with American sea-otter hunters who frequented the island in the early nineteenth century. These visitations resulted in encounters between Americans, native Hawaiians, Alaskans, and native Californians that are only beginning to be understood. Ships' logs from these episodes reveal that the sea-otter hunters, intent on smuggling, also used the island to careen and repair their ships, conceivably resulting in material exchanges. The ways in which the Pimu Tongva mixed the old with the new reveal how a coastal Californian group continued to craft their own identity in a rapidly changing world.

Ringle, William (Davidson College), Tomás Gallareta Negrón (Centro Yucatán/INAH) and Dan Griffin (Independent)

[243] *Lidar-Aided Ground Survey in the Puuc Hills, Yucatán, Mexico*

A 2013 NASA lidar mission passed over the eastern extreme of the region being investigated by the Bolonchen Regional Archaeological Project (BRAP), in the process partially imaging the secondary site of Acambalam II/III. A substantial portion of the site was ground-checked during the summer of 2016. This paper discusses post-collection lidar processing and the possibilities for feature detection and landscape use revealed by ground truthing. The data also provide interesting demographic information on a broader scale for comparison with our 11 km² 100% pedestrian survey carried out by Gallareta.

Ríos, Amanda [201] see Martinez, Jupiter

Rios, Luis [86] see Cardoso, Hugo

Rios Ortega, Maria del Roble (UASLP)

[352] *Celebration and the Mining Way of Life in Magistral del Oro Durango*

In this paper I present the historic and archaeological records, of social gatherings that formed an integral part of the mining way of life and the material culture that represents it. The study is focused on the town of Magistral del Oro, Durango in northern Mexico. This region was forged by mining activity in colonial times. Though the village today has been largely abandoned, traces of both labor and domestic areas still remain. Furthermore, photographs

and interviews with people who worked the mine and lived in the village shed light on important festivities that have become a part of northern Mexican culture. I combine this information, with a study of architecture and spatial configuration, in order to reveal the significance of social gatherings for the miners of the past.

Riris, Phil C. (University College London)

[327] *Conceptual and Technical Connectivity in Indigenous South American Rock Art Traditions*

Archaeologists have long sought to explain the distribution of rock art traditions across Amazonia and circum-Amazonia with reference to stylistic variability in the iconography, often as a proxy for exploring shared concepts of symbolic representation, mediated through local cultural norms. Where it has been possible, cross-referencing this kind of data with the ethnographic and archaeological records has engendered valuable new interpretations of indigenous symbolic repertoires in a variety of settings. As more systematic research takes place, comparative syntheses of rock art have begun to emerge that hint at the true scope of a variety of traditions, providing tantalizing evidence of the extent that rock art is bound up in the exchange of other categories of culture, both material and ideational, across time and space. Building upon these trajectories, this paper will outline some new suggestions for how rock art, and perhaps indigenous iconography more generally, may be formally investigated along the axes of technical and iconographic variability. Methodological and conceptual challenges are identified in order to suggest the steps which may be taken to mitigate them. In doing so, the ultimate goal will be to connect disparate datasets by adapting cross-disciplinary methods to the study of indigenous art.

[327] *Chair*

Rissolo, Dominique (University of California, San Diego), Michael R. Hess (University of California, San Diego), Jose Huchim Herrera (Instituto Nacional de Antropología e Historia) and Fabio Esteban Amador (National Geographic Society)

[386] *Satunsat Revisited: Comprehensive Digital Documentation of an Architectural Cave at Oxkintok, Yucatán*

Satunsat, or the Labyrinth, at Oxkintok is one of the most unique structures in the Maya lowlands. Inside this otherwise unremarkable terraced building platform are interconnected vaulted passageways that span three levels. In addition to functioning as an observatory, Satunsat has also been interpreted as a symbolic cave, and was in fact referred to as a cave by the residents of Maxcanu during the nineteenth century. The phenomenon of architectural caves is well documented and lies along the continuum of subterranean or semi-subterranean spaces, which includes artificial caves. Recent 3D documentation enables researchers to better examine the complex morphology of the structure while revealing more naturalized tunnel forms and the relationship between carved bedrock and masonry. Results suggest that the cave-like nature of the passageways in Satunsat is not incidental, but rather reflects the interplay between domains more common to Maya notions of sacred space.

Rissolo, Dominique [44] see Tucker, Carrie

Ristvet, Lauren (University Of Pennsylvania)

[157] *Peripatetic Kingship, Pilgrimage and Pastoralism: Reevaluating the Politics of Movement in the Ancient Near East*

Pilgrimage is a popular phenomenon, one which involves people traveling to and gathering at specific places during specific times, usually as part of a shared religious tradition. In the Ancient Near East, religious travel existed alongside other forms of mobility with important political and social consequences, like peripatetic kingship—in which there is no one fixed court—a characteristic of the Uartian (ca. 800–600 BC), Achaemenid (ca. 550–330 BC), and Seleucid (ca. 300–100 BC) empires, or the widespread practice of pastoral nomadism. This paper will focus on the relationships between these three forms of mobility, with special attention to the different relations between human and nonhuman actors that each sort of mobility permitted. Religious pilgrimage flourished in areas that had long histories of mobile pastoralism and drew upon many of its practices. At the same time, peripatetic courts congregated in places charged with affect. In some cases, these could be cultic centers like Musasir in Urartu, places of ancient political importance like Babylon in the Persian Empire, or new capitals like Seleucia in the Seleucid Empire. Juxtaposing these practices will allow us to view pilgrimage in a new light.

Ritchison, Brandon [163] see Thompson, Victor

Ritzman, Terrence [40] see Schoville, Benjamin

Rivals, Florent [389] see Rosell, Jordi

Rivas, Alexander (Washington University in St. Louis) and Brent Woodfill (Georgia State University)

[218] *The Highland Maya Conquests of the Northern Transversal Strip from the Early Postclassic through the Twenty-First Century*

Salinas de los Nueve Cerros was a massive city in west-central Guatemala that was built around the only non-coastal salt source in the Maya lowlands. In spite of this lowland location, highlanders were drawn to it for its agricultural potential and the rich concentration of salt. In this paper, we will look at the three major colonization attempts of the salt works and the surrounding region by Maya highlanders—the Early Postclassic, the conquest period, and the late twentieth century. After the city was abandoned in the Early Postclassic, the salt source was actively exploited by highland groups. Around 1600, the Gulf Coast Akalaha' Maya pushed them out; the conversion of the Maya of Verapaz appears to have been part of a larger strategy to take it back. The region was largely devoid of permanent residents after a Spanish incursion in the 1690s, leaving it to be exploited by Q'eqchi' and other highland Maya families. During the Guatemalan civil war, many of these families started to move into the region full-time, and today it is one of the principal centers of highland Maya culture in spite of its lowland location.

Rivera, Patrick (University of Maryland)

[207] *Celtic Crosses and Quetzal Masks: On the (Re)production of the Archaeological Record*

In an era of globalization and mass production, archaeological objects and images are not immune to being transformed into commodities and sold for profit. This (re)production of the past can profoundly influence the ways that consumers understand the history of particular times and places—often erasing the experiences of marginality and resilience that archaeologists work so hard to recover. This paper examines two distinct cases in which historical images (and periods) are being transformed into objects for consumption: the proliferation of Victorian-era Irish concept pubs, and the production of “ancient” Maya masks for the tourist trade in the Yucatán. These examples show how the archaeological record is increasingly implicated in the negotiation of identity and memory within a global market culture that values the past as a spectacle.

Rivas, Scott (Indiana University of Pennsylvania) and Sarah Neusius (Indiana University of Pennsylvania)

[61] *Second Line Resources? Evaluating the Relationship between Human Demography and Aquatic Resource Use during the Eastern Archaic*
 As part of its investigations the Eastern Archaic Faunal Working Group (EAFWG) has been examining multiple explanatory models for Archaic variability and change in aquatic resource use. One traditional model argues that the intensified use of aquatic animals can be attributed to population growth and aggregation. In order to test this model the EAFWG explored possible methods for reconstructing Archaic population demographics. Until recently broad-scale Archaic population reconstruction has proven difficult to pursue, due in part to relatively few Archaic period sites and a lack of traditional population markers preserved within these sites. However, the development of networked digital repositories has made Archaic population reconstruction possible on a regional level. For this investigation information on Archaic sites was accessed for seven states located in the Eastern Woodlands region using site file data curated in the Digital Index of North American Archaeology (DINAA). Using site distributions and temporally diagnostic artifact data as proxies for population combined with site topographic setting the EAFWG was able to estimate population growth and aggregation over time throughout the Archaic period. These estimates can now be correlated with data on the use of aquatic resources from the EAFWG collection of faunal databases.

Rivera, Francisco (Université de Montréal), Rodrigo Lorca (SurAndino-Estudios Arqueológicos y Patrimoniales L), Paula González (Universidad de Chile), Wilfredo Faundes (Independent researcher) and Karol González (Universidad Alberto Hurtado)

[231] *Mineros del Alto Cielo: Social Space and Materiality during the Capitalist Expansion in the North of Chile (Ollagüe, Twentieth Century)*
 In Chile, the process of modernization, expressed by the expansion of capitalism and industrialization, had many economic and social impacts. Based on sulphur mining camps located in Ollagüe, a commune of the Antofagasta region, we show the importance of modern materiality associated with the development of mining industries in northern Chile during the twentieth century. We consider that the modernization process, the industrial ruins and the materiality of the recent past, have generated memory spaces which are intertwined with local indigenous communities contemporary preoccupations. The peculiarities of Latin America's modernization and capitalist expansion can be understood through the uniqueness of local practices and the material remains to which they are associated. Essential to the recognition of such processes, notions of temporality allow us to approach this materiality in terms of continuity and ruptures. Heritage policies and archaeological practice, through their material remains, gives us new insights about local memories and identities. This archaeological approach gives presence to this temporal fragmentation, generating a local and global political commitment toward the recent past, its material culture and industrial sites.

Rivera Araya, Maria Jose and Suzanne Pilaar Birch (University of Georgia)

[223] *Assessing Stable Isotope Data from Archaeological White-Tailed Deer Remains as a Paleoenvironmental Proxy at the Site of La Joyanca, Northwestern Petén, Yucatán Peninsula*

The sociopolitical reorganization of the Maya that took place during the Terminal Classic (AD 850–1050) has been interpreted as being correlated to regional environmental change, specifically drought. However, few climate reconstructions come from the southern Maya lowlands where the decline occurred during this period. While most paleoenvironmental reconstructions lack a local, site-related signature and instead reflect regional trends, stable isotope analyses of herbivore faunal remains have proven to be a useful tool for providing local insight into ancient environments. Our research is the first to examine the potential of white-tailed deer (*Odocoileus virginianus*) teeth for recording seasonal changes in precipitation and vegetation at the secondary political center of La Joyanca, northwestern Petén, during AD 850–1050. A sample of second and third molars from white-tailed deer from the site were analyzed for intra-tooth oxygen and carbon isotopes. Records of precipitation seasonality and vegetation change were derived from the samples. A modern comparative dataset from the southeastern United States was also analyzed to aid in the interpretation of the results.

Rivera-Collazo, Isabel (University of California San Diego)

[224] *Puerto Rican Cultural Heritage under Threat by Climate Change*

As a tropical, oceanic island in the northeastern Caribbean Sea, Puerto Rico is feeling the effects of climate change. Rising sea level, increased storminess, and unpredictable sudden weather events combine with heavy coastal occupation and little or no coherent development planning, to increase social vulnerability to coastal change. The burden of economic problems that the Island is suffering from also increases the complexities of working toward resiliency. Within this context, coastal heritage and local and traditional knowledge are not priorities for the government and only have been superficially considered within climate change conversations. This presentation summarizes the work that has been conducted in Puerto Rico to assess coastal heritage under threat by climate change and the actions under way to improve the prospects of documentation, recording and preservation of the mostly unknown coastal history of this island.

[1] *Discussant*

Rivera-Collazo, Isabel [69] see Pérez, Jan

Rivera-Collazo, Isabel [370] see De La Torre Salas, Natalie

Rizzuto, Branden (University of Toronto)

[164] *The Origins and Development of Arsenic Bronze Technologies on the North Coast of Peru: Preliminary Results from Archaeometric and Experimental Investigations*

This paper highlights the preliminary results of an ongoing study that aims to further characterize the origins and subsequent development of arsenic bronze technologies on the north coast of Peru. While the production of arsenic bronze on the north coast has been studied in detail over the last several decades, the spatial and temporal origins for the use/production of these alloys—and how they spread throughout the region during the Middle Horizon (600–1000 CE) period—are not yet fully understood. The study aims to address these questions through the synthesis of archaeometric data obtained from metallurgical materials/by-products from multiple Middle Horizon archaeological sites across the north coast, with a particular emphasis on diachronic and spatial analysis of the data so that a narrative of the use/production of arsenic bronze on the north coast of Peru can be written. Still in its early phases, the paper thus highlights the results of current archaeometric and experimental investigations of arsenic bronze use/production. Additionally, the Late Moche site of Huaca Colorada (600–900 CE; Jequetepeque Valley), and the Middle Sicán (900–1100 CE) site of Huaca Loro (La Leche Valley), are used as analytical case studies.

Robb, John (Cambridge University)

[31] *Osteobiography: A Conceptual Framework*

Osteobiography provides a rich conceptual basis for understanding the past, but its conceptual basis has never been systematically outlined. It both stands in conceptual opposition to a traditional statistical approach to bioarchaeology modelled upon clinical studies in biomedicine, and is interdependent with it. As such, its position mirrors those of clinical case histories as opposed to statistical studies, participant-observation ethnography as opposed to quantitative sociology, and microhistory and biography as opposed to quantitative history. Such comparisons provide a framework for

exploring the strengths and weaknesses of osteobiography. It is not merely a tool for engagingly illustrating the “typical” life history as established statistically. Rather, it allows us to understand issues which population studies cannot explore. These include both analytical directions (exploring the complexity of deeply layered data, understanding the role of contingency in human lives, integrating osteological and cultural evidence) and philosophical directions (the interaction of material and conceptual factors in the creation of human bodies, embodiment, the experience of time).

[210] Discussant
[31] Chair

Robb, Matthew (Fowler Museum @ UCLA)

[179] *The Daily Experience of Space in Teotihuacán*

This paper will explore the daily experience of space in one of ancient Mesoamerica's quintessential urban environments, Teotihuacán. We often understand places like Teotihuacán through a consideration of its monumental structures and their relationship to the natural landscape, and emphasize the impact of specific burial events on social memory. Classic examples like the Street of the Dead's geomantic procession in the heart of the city plan, or the Ciudadela's stage-set quality, seemingly designed for large-scale gatherings of people witnessing rituals performed by the city's rulers, help define one of its most urban qualities—the synchronization of behavior and movement. The scale of such activities suggests they were reserved for special occasions. But how were these varieties of Teotihuacán's spatial synchronization present on a regular, less singular basis? How did quotidian rituals of waking up and going about everyday life reflect or resist the dominant spatial practices of the city center? Informed by a binary understanding of its ceremonial spaces as carefully calibrated alternations between accessible and inaccessible; visible and invisible; inside and outside; above and below, I will argue that Teotihuacán's numerous apartment compounds provided the small-scale experience that the city as a whole amplified and transformed.

Robbins, Brady (Brigham Young University) and Spencer Lambert (Brigham Young University)

[367] *Fremont Worked Bone Gaming Pieces: Their Life History Using Data from Wolf Village*

We examine the life history of Fremont worked bone gaming pieces. Fremont gaming pieces have long been interpreted as instruments of gambling due to their similarity to items used historically in Native American gambling practices. During our research we analyzed all of the worked bone gaming pieces from Wolf Village and compared our results with ethnographic accounts of Native American gaming pieces. Our research focuses on two aspects of the Fremont gaming piece life histories which have been mostly overlooked: production and disposal. By focusing on the neglected portions of the life histories we can develop a more holistic understanding of the use of Fremont gaming pieces. We also consider the role that gaming pieces had in trade, specifically trade at Wolf Village. The results of our research indicate that the Fremont had well-developed ritual practices which may have included divination and imitative magic.

Roberts, Hayley

[394] *Local Archaeology Societies in the United Kingdom*

Local archaeology societies in the UK are unique. They are a product of the British political and legal system combined with cultural attitudes to the past and the development of the archaeological profession. They are a melting pot of inexperienced beginners, expert volunteers, professional archaeologists, and everybody in between. As a unique form of public and community archaeology, they allow volunteers to have a significant positive impact for and on both archaeology and society. This includes archaeological practice as well as material culture and landscape. This presentation will illustrate doctoral research that has documented the activities undertaken by local archaeological societies. It will consider the context for local archaeology societies, the motivation that drives their members, and the impact that they have. Finally, it will suggest a model for best practice to ensure that the potential for these societies is capitalized upon to most benefit all involved.

[291] Discussant

Roberts, Jerod (Shumla Archaeological Research & Education Center), Victoria Roberts (Shumla Archaeological Research & Education Center) and Carolyn Boyd (Shumla Archaeological Research & Education Center)

[126] *Around the Lower Pecos in 1,095 Days: A Baseline Rock Art Documentation Project*

The Lower Pecos Canyonlands of southwest Texas and northern Mexico houses some of the most complex and compositionally intricate prehistoric rock art in the world. Presently, there are over 300 archaeological sites reported to include rock art in Val Verde County Texas, with a vast majority not being revisited since they received their site designation 30 to 50 years ago. In January 2017, Shumla Archaeological Research and Education Center launched the Baseline Rock Art Documentation Project: a three-year project designed to gather an extensive dataset from all known sites and from previously unreported rock art sites discovered through canyon surveys. Data such as accurate site locations, high resolution panoramic images, 3D models created by Structure from Motion, and context photography will be collected in the field. New, amended, updated, and revised TexSite and Shumla Rock Art Site Forms will also be completed and submitted to our SHPO designated repository. This vast and multifaceted dataset will open areas for future research including rock art distribution and directionality patterns, motif attribute studies, landscape archaeology, and conservation assessments. It will also digitally preserve into perpetuity the full rock art assemblage for an entire archaeological region.

Roberts, Jerod [126] see Roberts, Victoria

Roberts, Tim (Texas Parks and Wildlife Department)

[273] *Laser Removal of Graffiti from Pictographs at Hueco Tanks State Park and Historic Site, El Paso County, Texas: A Five-Year Review*

In 2009, a three-phase project was initiated at Hueco Tanks State Park and Historic Site to remove graffiti that was painted over Native American pictographs, using portable lasers. The first phase of this project tested the ability of a laser to remove graffiti from an area of rock that did not contain pictographs; this test showed that a laser could be used to remove layers of graffiti from the igneous formations at the site. In 2010, samples of graffiti paint that was not directly on the pictographs to be treated were taken and subjected to multiple laboratory tests to identify their composition. Noninvasive techniques, including X-ray fluorescence (XRF), Raman Spectroscopy, and Fourier Transform Infrared Spectroscopy (FTIR), were used in the field to identify the composition of the pictographs themselves. These tests were also used to help identify the mineral content of the underlying rock. The resulting information was beneficial in calibrating, and testing, the lasers to distinguish rock imagery from graffiti. In 2011, lasers were used for the first time at Hueco Tanks to successfully remove graffiti from pictographs. As of 2016, after five years of monitoring, there was no evidence of negative impact resulting from this laser treatment.

Roberts, Victoria (Shumla Archaeological Research & Education Center), Audrey Lindsay (Shumla Archaeological Research & Education Center), Jerod Roberts (Shumla Archaeological Research & Education Center) and Carolyn Boyd (Shumla Archaeological Research & Education Center)

[126] *The Tale of Rattlesnake Canyon: Ongoing Documentation of an Endangered Rock Art Site*

The Rattlesnake Canyon mural represents one of the most well-preserved and compositionally intricate rock art murals in the Lower Pecos Canyonlands, and perhaps the world. Deposited gravels from a major flood episode in June 2014, however, raised the canyon floor approximately 10 feet, enabling future floods to destroy the fragile panel. This presentation provides an update on emergency documentation efforts currently underway at Rattlesnake Canyon. Documentation and analyses of this mural includes 3D modeling and other advanced photographic techniques engaging color management, digital field microscopy to examine paint layer stratigraphy, production of graphic databases for the 271 figures comprising the mural, elemental analyses of the pigments using pXRF, and the collection of detailed attribute data for each of the figures. This level of detailed documentation is not only preserving the site for future generations, it is also revealing a highly sophisticated graphic expression produced by foragers approximately 3,000 years ago.

Robertshaw, Peter (CSU San Bernardino)

[136] *Decline, Collapse, and Regeneration of the State in Sixteenth-Century Bunyoro (Uganda): A Diachronic Archaeological Perspective on Ritual and the Negotiation of Creative Power*

Historical research by David Schoenbrun has identified the arrival of a new ruling dynasty in the sixteenth century as a pivotal moment when instrumental power was decoupled from creative power in Bunyoro. Unlike previous rulers in Bunyoro, the new Bito kings were not healers and spirit-mediums. New state rituals developed both in new places and at preexisting shrines, as is evident from historical and ethnographic sources. Archaeological investigations at known shrines and other sites, all of which were probably locales of ritual performance, situate these events of the sixteenth century within a longer-term (and AMS-dated) perspective that explores the complex interplay of ritual, healing, and drought in the development and decline of complex polities in the region. A major challenge, however, is the identification of ritual in this archaeological record, which is attempted here by invoking ideas of conceptual metaphors that link the materiality of the archaeology to belief systems. Future research should perhaps focus on the more recent past, specifically historic capital sites and regalia.

Robertson, Frances (Simon Fraser University) and Andrew Trites (Marine Mammal Research Lab, University of British)

[378] *New Insights into the Quileute Whalers of Washington State from Ecology and Archaeology*

The Quileute people of Washington State are an ocean going people dependent on marine resources. They are skilled fishers and hunters, and like their neighbors to the north, the Makah and the Nuu-chah-nulth, they have a history of exploiting the once abundant marine resources in both coastal and offshore waters. While much is known of about the whaling activities of the Makah and the Nuu-chah-nulth, little is known about the whaling activities of the Quileute, especially 20–40 miles offshore. We used a combination of archaeological, ethnographical and ecological sources to determine which species were hunted, which species would have been available, and where Quileute hunters would have had to travel to find them. Gray whales would have been the most abundant and were regularly harvested by the Quileute in the 1800s. Humpback whales were harvested in the same manner as gray whales. Both species occurred close to shore, but also as much as 20 miles offshore. Astonishingly the Quileute successfully caught nine documented fin whales in 1888—a species found along the shelf-break some 30–40 miles offshore. The evidence of where Quileute whalers were hunting indicates that they were exceptional seamen, navigators, and whalers.

Robertson, Frances [387] see Trites, Andrew

Robichaux, Hugh [83] see Lewis, Brandon

Robin, Mathieu F. [181] see Ferrari, Giada

Robinson, Brian [186] see Leach, Peter

Robinson, Erick (University of Wyoming) and Robert L. Kelly (University of Wyoming)

[81] *The Paleoindian-Archaic Transition in the Western United States: A Bayesian Approach*

Summed probability distributions of large radiocarbon datasets provide a powerful method for investigating prehistoric population change at multi-centennial and millennial scales of analysis. However, summed probability distributions cannot account for statistical scatter and uncertainties accompanying individual calibrated radiocarbon dates, which means that they are ineffective for answering questions related to cultural persistence and change on shorter centennial scales. For these shorter time scales we turn to Bayesian statistical analysis for its ability to develop probabilistic models that explicitly incorporate statistical uncertainties in the analysis and enable robust estimates for the start, end, and transition dates of prehistoric cultures. We propose a working relationship between summed probability approaches and Bayesian modeling by using the latter approach to test hypotheses developed by the former approach, using a comprehensive radiocarbon database for the Paleoindian and Archaic periods in the Western United States.

[256] *Discussant*

[227] *Chair*

Robinson, Eugenia

[218] *Interaction in the Late Classic Kaqchikel Area and Adjacent Pacific Coast: Least Cost Routes*

Least cost analysis of prehistoric nodes of interaction in the Kaqchikel Guatemalan highlands and Pacific Coast indicates the locations of viable travel routes. Several classes of data, such as sculpture, obsidian and ceramics, indicate that there was communication and economic exchange in the Kaqchikel Maya area in the central highlands and Cotzumalguapan Piedmont during the Late Classic Period (AD 600–830). Today people walk between neighboring towns on foot paths and roads designed for cars that span ravines and flat land. This practice indicates that walking these routes is a viable means of communication for an agricultural people today and have been documented for other areas, such as Chinautla. Using the distribution of San Martín Jilotepeque obsidian and Cotzumalguapan style sculptures as a guide to areas of interaction, trade and communication, this paper will explore efficient means of foot travel determined by least cost routes throughout the highlands and piedmont in the Late Classic period.

[182] *Chair*

Robinson, Mark (University of Exeter)

[174] *Integrating Archaeobotany to Provide Insight into Domestic and Public Ritual in Southern Brazil*

Archaeobotanical results are integrated with archaeological and paleoecological data for the southern proto-Jê of the southern Brazilian highlands. Results from a domestic structure displays a pattern of architectural termination and renewal that not only uncovers an ancient ritual practice, but also

reveals practices of plant management when considered alongside paleoecological data. Within the wider context, the data support a change in the performance of ritual practices revolving around fire from the domestic to the public landscape. The data show the value of archaeobotanical research and its integration into the wider research design, as well as the importance of developing methodologies that are appropriate to ask questions about the specific culture being studied.

Robles, Camilo [32] see Reyes, Omar

Robles Cortés, Erika Lucero (Proyecto Templo Mayor)

[225] *Crocodiles in the Offerings of the Great Temple: Use and Symbolism*

The numerous animals placed in the offerings of the Templo Mayor were brought in through tributes, trade, or spoils of war from every corner of the Aztec Empire—from tropical jungles to deserts. Indeed, the largest part of the fauna included in the collection at the Templo Mayor is identified as foreign. Crocodiles are among the exotic animals on display. This presentation explains the process of how these crocodiles were acquired, from their selection, to their hunt or capture, and, later, their transportation to Tenochtitlan. If crocodiles arrived alive, they were probably sheltered in "Moctezuma's Zoo." When deposited in the offerings, some of these crocodiles were buried entirely, while others were turned into leather or ornaments. The location, orientation, and relation of the crocodiles with other animals and objects from the offerings were carefully planned. Some depositories were consummated in conjunction with the building's consecration, others were situated in the occasion of a funerary ritual, and some others were placed as messages to the Gods.

Robles Cortés, Erika Lucero [225] see Bolaño-Martínez, Nataly

Robles Cortés, Erika Lucero [225] see Favila, Mario

Robles Garcia, Nelly (Instituto Nacional de Antropología e Historia)

[200] *Investigaciones arqueológicas en la Sierra Norte de Oaxaca: El sitio de San Pedro Nexicho*

Recientes hallazgos etnohistóricos sobre San Pedro Nexicho, Santa Catarina Ixtepeji, realizados por científicos de la Fundación Alfredo Harp Helú de Oaxaca, abrieron la posibilidad de excavar el asentamiento Clásico-Postclásico-Colonial Temprano, mismo que representa el primer ejemplo de un sitio serrano del que se obtienen datos de contextos controlados. La problemática de destrucción y saqueo a la que se ha enfrentado por generaciones este sitio, nos permitió explorar tumbas en contextos domésticos, de las que obtuvimos documentación de la arquitectura funeraria, que se nos revela como una tradición de influencia zapoteca complementada con rasgos propios. La vajilla cerámica presente en las ofrendas, así como algunas esculturas asociadas a la arquitectura nos muestra una fuerte influencia del Valle de Oaxaca, tanto como una expresión propia en manufactura, expresión plástica y diseños. El proyecto es pionero para el estudio enfocado en un sitio en esta región montañosa de Oaxaca.

Robles Garcia, Nelly [200] see Corbett, Jack

Robles Martínez, Edsel Rafael and Gilberto Pérez Roldán

[94] *La fauna del sitio de Tamtoc: su procedencia, su aprovechamiento y las implicaciones para el asentamiento humano*

Tamtoc se ubica en la huasteca potosina, área donde confluyen elementos de las zonas biogeográficas neoártica y neotropical, lo cual genera una diversidad de ecosistemas que repercute en una gran riqueza biológica que pudo haber sido explotada por los habitantes prehispánicos del sitio. Los estudios biológicos reportan un total de 226 especies disponibles de vertebrados en la huasteca potosina, sin embargo la fauna identificada en el estudio arqueozoológico no sólo es autóctona, también hemos identificado restos alóctonos. Las especies locales eran obtenidas de cuatro ámbitos específicos: los asociados al río, los de caza-jardín, los domésticos y los procedentes de los ecosistemas poco alterados. La relación hombre fauna no se reduce a la alimentación, el análisis de los materiales del sitio de Tamtoc, nos permite dilucidar otras funciones como los elementos transformados como ornamentos y elementos utilitarios. La conclusión de este trabajo es reflexionar sobre las distintas relaciones de los habitantes de Tamtoc con la fauna, lo que genera nuevas preguntas que sirven como guía para futuras investigaciones, ¿en qué áreas se efectuó la domesticación?, en el caso de las especies obtenidas de la denominada caza-jardín implica la existencia de cultivos (¿qué áreas eran cultivadas y cuales sus cultivos?)

Robles Martínez, Edsel Rafael [225] see Morales, Montserrat

Robrahn Gonzalez, Erika (UNICAMP)

[360] *Collective Intelligence in Cultural Environment: Predictive Models, Preservation, and Valorization of Cultural Identity in a Brazilian Context*

The current days are becoming more and more demanding for researches on social sciences, considering the great changes happening globally on the last decades, changes that seem to be happening always on a faster pace than before. Many international institutions, including UNESCO, have been promoting discussions intended to bring new ideas on the role of Humanities on the current society, this from the standpoint of a global perspective. This challenge is also about the integration of knowledge, considering both the scientific one and the knowledge traditional communities that lived or are living on the sites being studied. On this scenario, the knowledge of past communities that were obtained through archaeological research, reveal different experiences or alternatives on how to handle the environment. Adding all of these experiences along the past and present, creating a process that will result in the current Cultural Environment. On this paper the conceptual synthesis on the subject and its applicability on research projects in Brazil is presented, three main topics are analyzed:

- Archaeology and Preservation on the perspective of global challenges;
- Predictive models on Archaeology;
- Cultural Identities and Collective Intelligence.

Rocha, Bruna (UCL–UFOPA) and Vinicius Oliveira (UFOPA)

[327] *Connectivity beyond the Floodplains: The Case of the Upper Tapajós*

The first millennium AD saw an increase in population density throughout much of Amazonia; this is testified by an increase in the number and size of coeval archaeological sites, many of which include anthropogenic dark earths, widely considered as proxies for intensive and continuous human habitation and alteration of the environment. The Terra Preta do Mangabal and Sawre Muybu sites were village settlements occupied from c. AD 700 and c. AD 900 respectively, located along the rapids of the upper Tapajós River. In spite of this geographical barrier, ceramics and lithics excavated from these sites suggest connections to faraway areas, reaching as far north as the Caribbean and south to the Brazilian shield. These materials simultaneously materialize local technological practices, processes of transmission, innovation and appropriation. As such they are well suited for an

exploration of approaches related to the concepts of communities and constellations of practice. Following an exposition of the sites and their materials, a comparison with the wider region will be presented. This will enable an evaluation of the interpretative potential of “communities and constellations of practice” and related concepts to provide us with tools to study past historical processes and social boundaries on local and regional scales.

Roche Recinos, Alejandra (Brown University) and Mallory E. Matsumoto (Brown University)

[369] *Maya Lithic Economies at Piedras Negras, Guatemala: Production and Exchange in an Elite Architectural Complex*

In recent years significant headway has been made to understand New World marketing systems. In contrast with the highly complex and easily identifiable market systems of the Mexican Highlands, ancient Maya systems of production and distribution have traditionally been assumed to have operated at the level of the household, and thus have been overlooked. However, recent work in the Maya area has shown the likely presence of production beyond the household at possible market areas. In this paper, we examine evidence from the 2016 field season at Piedras Negras, Guatemala for trade and production of jade, obsidian, and chert in the southern sector. We rely on a combination of lithic analysis, ethnographic data, and recent research on precolumbian markets to better understand economic dynamics at this major Maya site.

Rockwell, Heather (University of Wyoming)

[186] *Chair*

Rockwell, Heather [186] see Malloy, Kevin

Roddick, Andrew (McMaster University)

[22] *Beyond Ceramic Provenience: Interdisciplinary Research into Social Practices at LIRAC*

Dr. Kostalena Michelaki founded the laboratory for Interdisciplinary Research of Archaeological Ceramics (LIRAC) in 2006, thanks to funding by the Canadian Foundation for Innovation. She established this facility to examine the relationships between technology, society and the environment, through the archaeometric analysis of technological choices made by people in the production and use of ceramics. Scholars working in LIRAC, and in associated McMaster research centers such as the Brockhouse Institute for Materials Research and the McMaster Institute for Applied Radiation Sciences, have analyzed materials from North and South America, the Near East, and the Mediterranean. In this talk we explore three research projects—the Neolithic and Bronze Ages in Calabria, Italy, Late Woodland Ontario, and Formative Period in the Lake Titicaca Basin, Bolivia—to highlight the successes of LIRAC, and reflect on some of the challenges associated with analytical approaches in what might be called a social geoarchaeology. What unites these regionally diverse case studies is their application of geochemical and mineralogical methods to both explore questions of provenance but also underlying social practices. Our paper demonstrates the shared view that embedded within ceramic objects is a record of human decisions that constituted a range of social practices.

[22] *Chair*

Roddick, Andrew [22] see Cannon, Aubrey

Rodning, Christopher (Tulane University) and David Moore (Warren Wilson College)

[160] *South Appalachian Mississippian in the Appalachian Summit: The Pisgah and Qualla Phases in Western North Carolina*

Archaeologists have generally characterized the Pisgah phase in western North Carolina as the manifestation of Mississippian culture in the Appalachian Summit province, dating from AD 1000 to 1450, and the precursor to the Qualla phase, which dates from the 1400s through 1800s and is associated with historic Cherokee towns. The Appalachian Summit encompasses rugged topography, sprawling mountain ranges, and some of the tallest peaks east of the Mississippi River, and it is an area with some of the highest amounts of annual precipitation in eastern North America. This paper summarizes the chronology and characteristics of the Pisgah phase in the Appalachian Summit, its relationships to the Qualla and Burke phases in western North Carolina, and environmental conditions and climatic changes that shaped the development of the South Appalachian Mississippian cultural landscape. The people associated with Pisgah sites did contribute to the development of historic Cherokee culture in the Appalachian Summit, but so also did groups from areas in northeastern Georgia and northwestern South Carolina, and the Pisgah phase is also important in understanding Native American cultural diversity in the Appalachian Summit, the upper Catawba River Valley, and northeastern Tennessee at the point of early European contact in the sixteenth century.

Rodrigues, Antonia (Simon Fraser University) and Chelsey Geralda Armstrong (Simon Fraser University)

[77] *Ancient DNA and Historical Ecology: An Innovative Approach to Environmental Conservation*

It is now generally accepted that humans are the primary drivers of environmental change; virtually no ecosystem has escaped our influence. With increasing awareness of the impact of humanity on the biosphere, researchers have begun to focus on understanding, protecting and perpetuating biological diversity at all scales and levels of biological organization. One of the best ways to understand current and future anthropogenic impacts on biodiversity is by studying their effects in the past. Archaeological sites can be a great resource, containing evidence of environmental and cultural changes in deep time. Ancient DNA (aDNA) analysis combines the precision of genetic analysis with the time depth of archaeology, and thus it can provide unique insights when studying historical ecology. This presentation will provide a broad overview of aDNA analysis and use case studies to highlight the potential contributions this field can make to historical ecology. Finally, the use (or lack of use) of aDNA data in historical ecology will be explored, ending with recommendations on how to facilitate meaningful collaborations between the fields.

Rodrigues, Antonia [50] see Yang, Dongya

Rodrigues, Teresa (Gila River Indian Community), Ashley Bitowf (Gila River Indian Community) and Chris Loendorf (Gila River Indian Community)

[273] *Rock Art Conservation in the Gila River Indian Community, Arizona*

The Gila Indian River Indian Community is dedicated to preserving its heritage, and consequently has developed a rock art conservation program in order to care for, restore, and protect petroglyphs within community lands. The proximity of the large Phoenix metropolitan area increases the risk of trespass and vandalism within the GRIC. In recent years, damage at archaeological sites has included defacement and graffiti, and the theft of rock art boulders. Current restoration work has experimented with and utilized numerous techniques and products for cleaning paints and engine exhaust from rock art; these will be discussed in this presentation. We will consider the efficacy of the various graffiti removal products, including “elephant-snot” and “shadow max.” The work done by the Community’s Cultural Resource Management Program has resulted in an efficient and evolving plan for restoration

and conservation. Preservation efforts include community outreach and education as well as emplacement of barriers and increased law enforcement patrols. The combined efforts have resulted in numerous sites being cleaned and restored and an increase in awareness of the significance of rock art in communities on and off the GRIC.

Rodríguez, Miroslava

[120] *El Cerro Magoni o Nonoalcatépetl en el registro histórico*

El presente ensayo utiliza documentos del registro histórico para investigar la reasignación de significados al Cerro Magoni por diferentes grupos desde el siglo XVI hasta su presente definición como parte del Ejido de la comunidad Huerto Nantzha mediante el marco conceptual de la territorialidad. Ésta consiste en la apropiación y dominación de un espacio mientras que el territorio es distinguible y defendida por su dueño y defendida. El poseedor será quien dote de significados específicos al entorno natural que habita y posee: su ecúmene. Una manera de legitimación de la propiedad es el 'título de propiedad,' que puede consistir en documentos elaborados de acuerdo a tradiciones pictográficas prehispánicas, los escritos introducidos por la llegada de los españoles, u otros. Los documentos a menudo contienen información literal, pero esconden un trasfondo ideológico, cosmogónico, y social que reclama y respalda la legitimación del propio contenido. El presente trabajo considera el Cerro Magoni en su condición de tierra patrimonial de los antecesores de Pedro Moctezuma para permitir comenzar con el rastreo de la reasignación de significados a un mismo espacio a través del tiempo.

Rodríguez Morales, Jorge [230] see Núñez Aparcana, Bryan

Rodríguez-Rellán, Carlos

[23] *From the Green Belt: an Appraisal on the Circulation of Western Iberian Variscite*

The Western half of the Iberian Peninsula plays a significant role for understanding the production and circulation of "green stone objects" (mainly variscite adornments, but also some jadeite ax heads) during the Neolithic and Copper Age of Western Europe. This importance lies in the presence in the area of two out of the three prehistoric variscite mines in Europe. Through an extensive review of the variscite adornments found in the archaeological contexts of Western Iberia, we will try to offer a comprehensive view of the spatial and chronological distribution of these objects and also to provide some hints that may help to increase our understanding of the significance that the "green stones" would have had for the prehistoric communities of the study area.

[23] *Chair*

Rodríguez Suarez, Roberto [30] see Buhay, Bill M.

Rodríguez Yábar, Alexis [308] see Tantaleán, Henry

Roe, Peter G. (University of Delaware)

[384] *Bayamanaco and the Cayman: The Mythic Origin of Manioc Cultivation, Amazonia-Antilles*

Recent trace analysis of Greater Antillean culinary implements finds a paucity of evidence for manioc until late times. This is anomalous since it was believed that manioc accompanied the first truly horticultural and ceramic-producing groups, the Saladoids, from the Orinoco lowlands of South America through the Lesser Antilles to Puerto Rico at 800–500 BC. Such late occurrence also contradicts the fact that manioc is a lowland cultigen, spanning northern tropical South America. Actual tubers from arid early sites along the Peruvian coast at 3000 BC suggest even earlier lowland dates, early enough for the Saladoids to have taken it with them. Utilizing "cultural archaeology," pioneered by Irving Rouse and Donald Lathrap, this paper address this anomaly, comparing the Bayamanaco myth from Hispaniola, recorded by Fray Ramón Pané (1498), to the Caymanic origin of manioc instantiated @900 BC on the Tello Obelisk at the ancient Andean ceremonial center of Chavín de Huántar, Peru, as well as in ethnographic Pan-Amazonian mythology. Thus the "mythic charter" for this crucial horticultural pattern is equally old and spans the Amazonia-Antilles culture areas. This implies that preservational bias may account for the lack of early manioc residues on artifacts from the Antilles and northern South America.

Rogers, J. Daniel (Smithsonian Institution)

[25] *Political Process, Polity Formation, and the Role of Urban Centers in Inner Asia*

By 200 BCE the eastern steppe regions of Inner Asia saw the development of expansive and complex political systems usually referred to as empires. The origins of these polities and the processes of consolidation can be described within the concept of a political community, reflecting the actions of competing groups in expansive social network. For Inner Asia, community was linked to issues of mobility, dispersed control hierarchies, and the economics of multi-resource pastoralism. Together, these patterns offer an alternative vision of the origin and operation of early complex polities. Archaeologically, the pastoralist way of using the built environment provides a window into the dynamics of political processes that operated within a particular polity, but also within multiple polities across long stretches of time. Based on a sample of 77 sites within 13 steppe polities distinctive patterns of political processes altered and incorporated community and place in the building of fortified settlements, palaces, military posts, and other constructions. The evidence suggests that these polities operated as spatial networks that relied more on mobility than the direct interactions seen in urban centers in sedentary societies. Urban centers tended to be the byproduct of polity formation, rather than the source.

[268] *Discussant*

Rogers, Thatcher and Elizabeth Peterson (Simon Fraser University)

[237] *From Medio to Missionization: A Comparison of Lithic Technology in the Casas Grandes Valley into the Protohistoric Period*

After the early Medio period, populations subsisting in the Casas Grandes region, northwest Mexico experienced internal and external pressures that led to drastic reorganization of their socioeconomic system. This is reflected by significant changes in their lithic tool kit, where differences in raw material use and tool morphology accrued through time. Presented here are the results of our lithic study comparing multiple excavated Medio and the only excavated protohistoric site located throughout the Casas Grandes regional core. Comparing the organization of lithic technology of early/late Medio large-medium size sites to late Medio small sites in Casas Grandes, as well as studying changes in lithic types into the protohistoric period, provides one means by which to explore how people respond to drastic cultural changes through time.

Rohland, Nadin [92] see Kim, Alexander

Rojas Fernández, Yuitza (University of Puerto Rico—Río Piedras Campus)

[289] Engendering Ballajá: A 1910 Case Study from San Juan, Puerto Rico

In the northwest corner of the capital city of San Juan, Puerto Rico, formal urban blocks were proposed and constructed in the nineteenth century in an area known as Ballajá. As part of a larger investigation, documentary research was carried out, and quantitative and qualitative data was analyzed to study the presence of women using the 1910 census. Germane to that investigation, were specific variables such as professions, trades, race, nationality, age and civil status, therefore providing specifics to characterize them. This presentation explores the viability of using the census information to describe domestic units within the ward. By incorporating a 1921 plan of the ward to this study, it will be possible to create various layers that show the distribution of women based on race, profession/trade, and civil status. Also relevant, will be information about women that were recorded as head of the household, and those who rented out rooms, as well as those who lived with other families, not necessarily related. The analysis of historic sources can be connected to the archaeological collection excavated in five blocks, and provide a better understanding of the people who lived in particular spaces, and the objects employed by them.

Rojas Ortiz, Carlos [7] see Pink, Jeremias

Roksandic, Mirjana (University of Winnipeg)

[30] Chair

Roksandic, Mirjana [30] see Buhay, Bill M.

Romain, William (Ancient Earthworks Project)

[283] *Cahokia: City at the Center of the Mississippian Cosmos*

Cahokia stands as the flagship city of the ancient Mississippian world. One of the enduring mysteries concerning Cahokia has been how to account for its skewed orientation and unique layout of its mounds and plazas. What accounts for the site's orientation east of north; and why are the mounds situated where they are? In this presentation I use recently obtained lidar imagery together with archaeoastronomic analyses to explore the idea that Cahokia was built according to a grand master plan. This master plan employed a standard unit of length and specific geometric shapes oriented to important celestial events. In this design, the structure of the cosmos was represented. There was more, however. As I will show, the layout of Cahokia was perhaps intended to facilitate the movement of spirit entities as well as human souls between cosmic realms. Cahokia functioned as an axis mundi—connecting This World to the Upperworld and Lowerworld. Among the spirit entities that may have moved along the Cahokian axis mundi were the mythic founders of the great city, arguably represented in proxy form by the so-called Mound 72 “beaded burial.”

Roman, Deborah (Stagecoach Museum/VCAS/CIM)

[249] *New AMS dating sequences for the Chumash Ventureño Early Period: Revisiting the Question of Antiquity of Ventureño Chumash Inland Occupation*

The dating of sites within the Ventureño Chumash interior region has been robust for Late Period, but less well represented for the Early and Middle periods. We present here a suite of dates that document a well-established “complex of sites” that all date to the Early to Middle period located adjacent to the Santa Monica Mountains and proximal to the Late Period ritual site of CA-VEN-632.

Roman, Didac [28] see Smith, Claire

Román Berrelleza, Juan Alberto (Antrop. Fis.)

[183] *La práctica del desollamiento humano entre los mexicas*

El desollamiento humano es una de las características más notorias asociadas a Xipe Tótec, una de las deidades más enigmáticas del panteón mexica. Durante largo tiempo los investigadores han aceptado sin reservas lo que las fuentes señalan con respecto a esta práctica ritual. Sin embargo, en fechas recientes han surgido varias preguntas en relación a esta práctica. Por ejemplo, ¿Es posible establecer un lugar de origen, temporalidad y evolución de esta práctica en Mesoamérica?, ¿Cómo se realizaba tal procedimiento? Es decir ¿Existió un procedimiento estandarizado para efectuar dicha operación?, por señalar solo unas cuantas. En este trabajo se pretende explorar, como antecedente, los casos que se tienen reportados en la literatura especializada donde se tengan indicios de la existencia de la práctica ritual del desollamiento en la época prehispánica. Interesan de ellos varios aspectos: su temporalidad, su localización geográfica, la cultura que la practicó. El objetivo final es abordar lo más desconocido de este ritual: la forma en que se realizó en el postclásico tardío; es decir, la técnica empleada para desollar a los individuos y los probables instrumentos utilizados por los mexicas, ello a partir de las huellas de corte observadas en los huesos.

Roman Buso, Gabriela (University of Puerto Rico Mayagüez Campus), Ash A. Matchett (IAUPR-BC), Juan Carlos Martínez-Cruzado and Edwin Crespo Torres (University of Puerto Rico Río Piedras Campus)

[156] *Molecular Disease Characterization in a Precolumbian Indigenous Population of Punta Candelero, Puerto Rico.*

Skeletal remains belonging to a Late Saladoid population from Punta Candelero site (AD 640–1200), southeast Puerto Rico were used for the detection of Pathogens. Previous studies have established the presence of trace genetic indicators of molecular disease in skeletal remains, such as syphilis and tuberculosis, with associated history or pathology. In this study, we are investigating the presence of various pathogens associated with precolumbian Indigenous populations of Puerto Rico. Paleopathology and preservation were a significant factor in sample selection. Characterization of the pathogen component of the ancient DNA was initially directed toward the detection of oral infections consistent with paleopathology and Neglected Tropical Diseases (NTDs) hypothesized to be widespread among the population. NTDs are a group of bacterial, viral and parasitic diseases, caused by known pathogens often with an unknown phylogenetic origin. Using sensitive ancient DNA amplification and sequencing techniques we have assayed this population to determine a pathogen Index for each individual and the population overall. We present preliminary results in compliment to existing archaeological information on the disease dynamics of this indigenous population to generate a comprehensive picture of the islands' complex precolumbian past.

Romandini, Matteo [169] see Peresani, Marco

Romero, Ashuni (Escuela Nacional de Antropología e Historia) and Ramón Santacruz (Instituto Nacional de Antropología e Historia)

[353] *Quimicho: A Classic Site in Northeast Tlaxcala, Mexico.*

Through an archaeological salvage project, the Quimicho archaeological site was explored for the first time. During the prehispanic period there was a system of circulation of natural, human, and ideological resources, which different groups in different moments took advantage of. For this system to work, different routes of distribution of wealth were established, generating a cultural exchange between diverse ethnic groups. The Quimicho archaeological site, situated in the Northeast region of the modern Mexican state of Tlaxcala, is part of the Teotihuacán corridor, a route that was controlled during the Classic period by the site of Teotihuacán, as proposed by García Cook in 1981. The archaeological exploration of Quimicho provides a model of archaeological indicators (such as ceramics and architecture) that can be reproduced at other sites along this corridor and can help to explain the cultural relationship between different ethnic groups and the large urban center of Teotihuacán.

Romero, Danielle (NV SHPO, NVFCP), Barbara Roth (UNLV) and Darrell Creel (University of Texas, Austin)

[303] *Chasing Tlaloc and Dragonflies in the Mimbres Valley: An Analysis of Ceramic Distribution and Style*

Anthropomorphic and zoomorphic figures were common design elements on Classic Mimbres ceramics. However, certain forms and motifs were more widely used than others. During the 2016 field season at the Elk Ridge Ruin, a bowl with a Tlaloc figure was recovered from a burned ramada area, and a sherd with a partial dragonfly was found in one of the pueblo rooms. While both of these figures were included on rock art panels, they were infrequent on ceramics. This paper examines the presence of dragonflies and Tlaloc figures on ceramics through time and space within the Mimbres Valley. Site reports and Mimbres ceramic databases were consulted to gather an inventory of ceramic vessels and sherds where either of these images occurred. This allowed for a visual analysis of styles and a means of gathering geographic data to map the sites in which these artifacts were recovered. Distribution patterns coupled with stylistic similarities and differences may help resolve the question regarding why these particular figures were used.

Romig, Lindsey [345] see Munger, Tressa

Roney, John (Colinas Cultural Resource Consulting), Robert Hard (University of Texas at San Antonio), Karen Adams (Archaeobotanical Consultant), A. C. MacWilliams and Andrea Thomas (University of Texas at San Antonio)

[303] *The Early Agricultural Period on the Upper Gila River, Arizona*

Recent excavation and survey documents substantial use of the Upper Gila River Valley in Arizona during the Early Agricultural period. We have identified at least two classes of Early Agricultural period sites in the Duncan region, cerros de trincheras and river terrace sites. Both contain residential architecture and evidence of a diversity of activities. Round Mountain, a cerro de trincheras, contains 1.9 km of walls and terraces and 16 rock rings and was constructed on a 640-foot hill during the Cienega phase (ca. 800 BC–AD 100). The DotMon site is situated on a 400-foot ridge above the river and includes 250 m of walls and six rock rings. The Coati and Duncan Donut sites are small residential sites built on terraces overlooking the river and contain evidence of domestic architecture including pithouses and rock rings. We summarize radiocarbon, flotation, architectural, and artifactual data from these sites to assess their respective roles and chronology during the Early Agricultural period.

Roney, John [303] see Corl, Kristin

Ronsairo, Karleen (George Washington University)

[369] *Figurines, Households, and Social Identities at La Blanca during the Middle Preclassic Period (900–600 BCE)*

La Blanca was one of two major regional centers during the Conchas phase (900–600 BCE) of the Middle Preclassic period in the Soconusco region of Pacific Guatemala. Household differentiation and social stratification at Preclassic sites in this region can be explored by analyzing the distribution of ceramic figurines across elite and commoner households at La Blanca. Through an analysis of typological distributions of figurines from La Blanca, I provide insight into the production and consumption of figurines and how figurines may have been used in practices of identity formation and social negotiation. Moreover, I consider standardization and variation in figurine attributes in order to further investigate figurine production and consumption as ways for their makers and users to distinguish themselves from others and to maintain household identity and status. Through my analysis of the La Blanca figurines, it is my goal to provide further insight into emerging centralized political systems in Preclassic Mesoamerica. By taking a microlevel approach to analyzing household differentiation and social identities at La Blanca, the results of this figurine study will inform us of the different ways people responded to increasing social and political inequality during the development of social complexity in ancient Mesoamerica.

Roos, Christopher (Southern Methodist University), Julie Field (Ohio State University) and John Dudgeon (Idaho State University)

[123] *Geographic Variability in the Onset and Intensification of Swidden Cultivation on Viti Levu, Fiji*

At some point between initial colonization and first contact with Europeans, Fijian economies transformed from being dependent upon marine foraging to dependence upon intensive agriculture. The timing and spatial pattern of this transition has beguiled archaeologists because the archaeology of Post-Lapita, "Mid Sequence" archaeology has been so scantily preserved and recovered. We employed geoarchaeological coring of terrestrial soil and sedimentary sequences along a transect from near the coast to more than 40 km inland to reconstruct the timing and geographic context of the transition to agriculture. We used radiocarbon dated charcoal concentrations and stable carbon isotope ratios to reconstruct natural fires, initial slash-and-burn cultivation, and swidden intensification from 5–6 m cores near known "Mid Sequence" archaeological sites. Our results suggest that local decisions to initiate or intensify swidden cultivation were complex and dependent upon local and regional climate, environment, and social contexts.

Roos, Christopher [123] see Field, Julie

Rosado Ramirez, Roberto (Northwestern University), Heather McKillop (Louisiana State University) and E. Cory Sills (University of Texas at Tyler)

[281] *Analysis of Marine Sediment of Ancient Maya Salt Works in Paynes Creek National Park, Southern Belize*

In this paper we present the results of archaeological research at two Classic period Maya salt works currently submerged in a shallow salt-water lagoon in Paynes Creek National Park, Southern Belize. These two contexts are part of the more than 100 locations so far identified in the area where salt was produced by boiling brine over fires near wooden structures. Through the study of marine sediment recovered at excavations from sites 24 and 35, we were able to document environmental and anthropogenic changes over time. This research included loss-on ignition of 32 sediment samples, along with macroscopic and microscopic descriptions of marine sediment. The results of these marine sediment analyses, in conjunction with data on their spatial distribution and their relation with cultural remains, provide insights on the timing and rate of sea level rise at these submerged salt works. These results advance our understanding of the abandonment of such salt production facilities in Southern Belize at the end of the Classic period.

Rosas, Jonathan (UNAM Posgrado Estudios Mesoamericanos)

[236] ¿Un jorobado enano? Una pintura de bóveda en el sitio arqueológico de Sacnicté, Yucatán

El presente trabajo versa sobre la pintura de la tapa de bóveda 1 del yacimiento arqueológico de Sacnicté, Yucatán. En ella aparecen representados un par de personajes, uno ha sido interpretado como un enano jorobado en actitud amenazante. Al respecto pongo en duda este planteamiento, ya que analizando diferentes aspectos de la imagen como la posición, la postura, el gesto y las características de cada individuo, propongo que se trata únicamente de un individuo jorobado, que señala al otro personaje el bloque de cartuchos jeroglíficos. Sobre esto debemos mencionar que los individuos con ciertas anomalías físicas desempeñaban roles importantes en el mundo maya, así lo atestiguan las representaciones en estelas, donde vemos a enanos acompañando a gobernantes; y en vasijas, donde se aprecian tanto jorobados como enanos danzando con la deidad del maíz.

Roscoe, Paul (University of Maine)**[324] *The Perplexing Complexity of Some New Guinea Communities***

At contact, a number of New Guinea communities boasted considerable 'horizontal' complexity—very large populations (up to 2,500 people) and ceremonial arenas that engaged even more. Many also constructed monumental architectures of organic material and staggering size. These communities included complex fisher-foragers and Big-man horticulturalists, organizations that are commonly identified as only minimally hierarchical. Certainly, their hierarchical institutions were insufficiently developed to account for the scale of their 'horizontal' complexity. After briefly surveying this complexity, this paper analyzes why these communities became so complex and the mechanisms that allowed them to manage their complexity.

Rose, Courtney (Pima County, Arizona—Cultural Resources & Historic Preservation Division) and Ian Milliken (Pima County, Arizona—Cultural Resources & History)**[366] *Pima County Cultural Resources Management on County Conservation Lands: Predicting Archaeological Sensitivity Zones and Refining Spatial Models***

Geographic Information Systems (GIS) modeling is vital to improve and focus cultural resources management strategies on the approximately 100,000 acres of conservation lands acquired by Pima County since 1997. These lands are dedicated for cultural and biological resource conservation and are the result of lands identified in the Pima County Sonoran Desert Conservation Plan (SDCP). The SDCP includes a static model depicting archaeological sensitivity that combines all archaeological site types and time periods together into low, moderate and high archaeological sensitivity zones throughout the County. The SDCP has been used for informing land conservation management decisions including infrastructure placement and ranching operations for mitigating threats to cultural resources by encroaching development. In order to account for the broader spectrum of potential impact agents on cultural resources, including erosion, ecotourism, vandalism, recreational use, and grazing, a newly designed GIS database using dynamic and contemporary data sources will allow us to refine the SDCP model. This poster presents an analysis of cultural resources from two sample conservation land areas in which archaeological sensitivity and threat assessments are modeled and field tested by sample survey to enable informed and efficient land management strategies to better conserve cultural resources.

Rose, Craig [224] see Bates, Brian

Rosell, Jordi (URV-IPHES), Ruth Blasco (CENIEH), Florent Rivals (IPHES-ICREA) and Maite Arilla (URV-IPHES)**[389] *Short-Term Neanderthal Occupations and Carnivores in the Northeast Iberian Peninsula***

Short-term human occupations can be developed in very distinct places and be related to very diverse functions. The low number of items left by the human groups in these sites usually generates discrete assemblages, which often adds difficulties to the subsequent archaeological interpretations. In the European Middle Paleolithic, are common short-term human occupations in caves and rockshelters frequented by carnivores as well (bears, hyenas, large felids, canids and other small carnivores) as hibernation places, dens or refuges. From an archaeological perspective, the resulting assemblages are a mixture of anthropogenic and carnivore items (palimpsests) in which the intensity of human occupation(s) is usually measured by the quantity of recovered lithic artifacts, hearts or modified bones. However, the detailed study of these sites can be significantly informative to understand some basic questions about the development of the human communities in a landscape, their movements across the territory, the diversity of activities that they were able to do and, the relationships established between them and other biological entities (mainly carnivores). This work aims to present the results on four sites with these characteristics located in the northeast Iberian Peninsula: Llenes and Tritons Caves (Lleida) and Toll and Teixonerres Caves (Barcelona).

Rosen, Arlene (University of Texas at Austin), Jennifer Farquhar (University of Pittsburgh), Joan Schneider (California State Parks) and Tserendagva Yadmaa (Mongolian Academy of Sciences)**[27] *Holocene Vegetation Cycles, Land Use, and Human Adaptations to Desertification in the Gobi Desert of Mongolia***

Since the retreat of the Pleistocene some 11,700 years ago, the landscape and vegetation of the Mongolian Gobi Desert has been profoundly changing, punctuated by the appearance of lakes, wetlands, and finally aridification. Vegetation communities have responded to these changes according to temperature shifts and northward to southward movements of the edges of East Asian monsoonal systems. Human groups have lived, foraged, and traveled through the landscape of the Gobi for millennia, adapting their technologies and systems of plant and animal use with the dramatic changes of flora and fauna, and likely contributed to the character of the vegetation communities in the region today. Yet little is known about the availability of plants and plant use from the early Holocene through to the end of the Middle Holocene, and the impact of human populations on these fragile natural environments. Research at the Ikh Nart Nature Reserve, Dornogobi Province, Mongolia, has yielded geoarchaeological and archaeological phytolith data which shows changing landscape and vegetation patterns associated with extensive use of small spring-fed drainages. Human land use shifted from foragers who exploited wetland plants to hunter-pastoral communities, whose use of wild plant resources changed with increasing desertification.

[110] *Discussant*

[95] *Chair*

Rosen, Arlene [360] see Farquhar, Jennifer

Rosenberg, Danny [22] see Carter, Tristan

Rosenfeld, Silvana (University of South Dakota)**[230] *Trade and Sacrifice: Osteometry, Skeletal Part Representation, and Paleopathology of Camelid Assemblages in the Central Andes***

Chavín de Huántar is a complex ritual site widely recognized for its connections to other regional centers. While much of this regional interaction is understood based on common ceramic styles and designs as well as the presence of nonlocal material, much less is known of the actual mode of transportation. Llama caravans most certainly played a key role in the movement of goods across space during Chavín times. Were llamas for caravans

raised in the proximities of Chavín? Were caravan llamas a prestigious item? Were caravan llamas consumed in different ways than other llamas or other camelid species? In this poster, I use osteometric analysis, paleopathology analysis, and skeletal part representation analysis to explore these issues. Preliminary analysis at Chavín indicates the presence, in some sectors of the site, of some unusually large sacrificed llamas with pathologies consistent with those of burden animals. In contrast, other sectors of the site include the presence of regular size llamas and alpacas with no pathologies in daily food residue contexts. The results have implications for better understanding economic and social aspects of ancient human behavior at this important site.

Rosenmeier, Michael [114] see Houle, Jean-Luc

Rosenstock, Eva [96] see Hendy, Jessica

Rosenswig, Robert (University at Albany)

[182] *Formative-Period Izapa Kingdom and Its Neighbors*

Mesoamerica is one of the cradles of civilization where the first kingdoms and states emerged during the latter part of the first millennium BCE. Recent lidar mapping and pedestrian survey documents the extent and internal political structure of the Izapa kingdom from its emergence at 700 BCE through its collapse after 100 BCE. At its peak, a four-tiered political hierarchy maintained internal cohesion and the distribution of large centers around the kingdom's perimeter established external sovereignty. The largest of a network of early kingdoms on the Pacific coast of southern Mesoamerica, the Izapa polity provides insight to the origins of urban life and hierarchical political relations.

Rosenthal, David (Smithsonian Institution, National Museum of Natural History) and Kerry Button (Smithsonian Institution, National Museum of Natural History)

[2] *Disaster Struck: Smithsonian Museum Support Center Earthquake Response and Recovery*

On August 23, 2011, an earthquake centered in Louisa County, Virginia, affected the nation's capital in Washington, D.C. Measured at a magnitude of 5.8, this was the strongest quake in the area since 1944, reaching as many as 12 states and felt as far away as Canada. The quake caused damage to a number of national landmarks including the Washington Monument, the National Cathedral, and several Smithsonian buildings. The Smithsonian Institution's Museum Support Center (MSC) in Suitland, MD, home to over 43% of the Smithsonian's 155 million objects and specimens, was severely impacted. This presentation will discuss the immediate response period at the MSC, longer term recovery efforts, and lessons learned to help mitigate future impacts, with particular attention paid to the collections housed and cared for by the Department of Anthropology.

Rosenthal, Jeffrey [383] see Whitaker, Adrian

Rosenzweig, Melissa (Miami University)

[285] *Chair*

Ross, June (University of New England)

[210] *Narrative or Analysis: Identifying Scenes in the Rock Art of the Kimberley and Central Desert, Australia*

Analysis of the composition of figurative motifs within rock art panels holds the potential to provide information on the relationships intended by the artist/s between humans, between humans and animals, or between animals depicted. Two contrasting rock art assemblages from Australia illustrate this potential; the paintings from the remote Kimberley in the tropical northwest, and the diverse geometric assemblage from the arid heart of central Australia. Ethnographic data provides explanations for the most recent painted scenes in both areas, with each assemblage depicting the activities of Ancestral Beings in the creation period, known as the Tjukurrpa in the desert or the Laili in the Kimberley. However, it is the formal analysis of earlier assemblages that enables us to identify scenes and formulate relationships between the motifs depicted. Social, ceremonial, economic and gender roles can be identified in panels depicting the elegant, Kimberley anthropomorphic figures known as Gwions. Relationships between the geometric motifs within panels in the desert present a greater challenge but analysis indicates that these are likely to have been created as an active part of ritual practices.

Rossen, Jack (University of Hawai'i at Hilo), Mahealani Pai (Kamehameha Schools) and Keonelehua Kalawe (Kamehameha Schools)

[43] *The Social Organization and Engineering of Agriculture at Maluaka in the South Kona Field System, Hawai'i Island*

Two field seasons of excavation have been completed at Maluaka above Keauhou on Hawai'i Island. The project is a collaboration between Kamehameha Schools, which administers the site as an educational facility, and the University of Hawai'i at Hilo. We wish to describe the collaboration between academics, Hawaiians and the lineal descendent community interested in cultural practice and revitalization, as well as the integration of Hawaiian knowledge and archaeological science. The site has been plane table and alidade mapped over several years. The 2016 work focused on platform and mound areas located at high promontories of the site. Excavations revealed fire pits excavated into pahoehoe lava and underground ventilated drainage canals. These activity areas, including high artifact density middens as deep as 1 m, may have been supervisor stations (konohiki) stations for directing work crews and observing the landscape and its alignments. Presented are preliminary observations on the social organization, artifacts and engineering of the site plus some directions for future research.

[65] *Discussant*

Rossi, Franco (Boston University)

[39] *The Obsidian Order at Copan: A Discussion of Science, Education, and Institutions in Late Classic Statecraft*

This paper investigates an order of ranked specialists marked by title Taaj ("obsidian"), as they occur at Late Classic Copan. This "obsidian order" was first identified on a mural at the site of Xultun, Guatemala, where archaeological evidence revealed that its members held expertise in indigenous Maya sciences, ritual practice and codex book production. Since then, the Taaj have been identified at several Classic Maya centers besides Xultun—with the texts of Copan providing the most detailed account of one Taaj in particular who lived during the reign of the sixteenth Copan king, Yax Pasaj Chan Yopaat; as well as mentioning another Taaj alongside the earlier, ill-fated ruler "18 Rabbit" (Waxaklajun Ubaah K'awiil). This paper constitutes a focused inquiry into the relationship between these Taaj, their rulers, and the courts of which they were a part, presenting associated archaeological evidence and considering related epigraphic data in the process. Through such analyses of the Taaj at Copan, I hope to shed light on a previously unknown aspect of Maya courtly life and pedagogy that is relevant to our models of sovereignty, ritual performance and knowledge transmission in the Classic Maya world.

Rossi, Francesca [118] see Pezzutti, Florencia

Ross-Sheppard, Callan (McGill University)

[25] *Not Sourcing: Prospecting for Khitan/Liao Ceramic Production Locales through the Geochemical and Mineralogical Characterization of Khitan/Liao Ceramic Assemblages*

Often the use of geochemical and mineralogical techniques to characterize archaeological ceramics is performed with the underlying idea that the goal of the enterprise will be the sourcing of the ceramics to their production locales. However, in many situations this goal may not be achievable due to such factors as a lack of variability in regional geologies or a lack of information on the scale, type and location of ceramic production. This paper looks at one such case from the Chifeng Region, Inner Mongolia, where the sourcing of Khitan/Liao (907–1125 CE) earthenware ceramic assemblages is not possible due to a lack of basic information on ceramic production. Instead ceramic mineralogical and geochemical data, attained by portable X-ray fluorescence spectrometry and optical petrography, is used to narrow down the possible locations of Kitan/Liao ceramic production sites. This approach reverses the goal of characterization away from assigning a ceramic to a production locale and instead uses mineralogical and geochemical data to prospect for possible production locales as well as to provide some comment on the variety and scale of ceramic production within the Chifeng region.

Rotem, Yael (Penn Museum, University of Pennsylvania)

[151] *The Transformation from Complex Village Society to Local Urbanism in the Southern Levant: New Observations in Light of Evidence from the Central Jordan Valley in the Early Bronze Age I–II*

The EBA Southern Levant experienced a dramatic pathway to complexity, creating a small-scale urban society. The transition from EBI to EBII periods was characterized by urbanization processes, in which sweeping changes in social structure, political landscape, and economic networks occurred. While the majority of research centered on the nature of the fully urban society in the region, there is no consensus for the specific mechanics and causes of the emergence of these early towns, and the reasons for the demise of the complex village society that preceded them. None of the existing explanatory models capture the regional variability and cultural diversity that differentiated this period in the southern Levant, nor were they able to identify the different paths that led to the development of urban system in this region, within the existing chronological framework. The study presented here seeks to tackle this gap, and focus on the critical period leading up to life in these urban centers in a specific geographic region: the Central Jordan Valley. I will argue that in absence of leveling mechanisms to maintain egalitarianism, EBI village society slowly transformed into a large, densely settled and non-egalitarian village system, setting the stage for urbanism in the EBII.

Roth, Barbara (UNLV)

[278] *Changes in Household Organization and the Development of Classic Period Mimbres Pueblos*

Changes in household organization were a major catalyst for social change in the Mimbres River Valley of southwestern New Mexico across the transition from pithouses to pueblos. This paper summarizes recent work at a large Pithouse period village, the Harris Site, and the Elk Ridge site, a large Classic period (AD 1000–1150) pueblo that is illuminating the relationship between households, community integration, and social change. Work at the Harris Site has documented the important role that corporate kin groups played in intra- and inter-village social dynamics. These social groups made up the “core households” (defined by Shafer 2003) that were the initial land-holding occupants of many of the larger Classic period pueblos. Data from Elk Ridge is further illustrating the different trajectories that households took as pueblos expanded during the Classic period. I explore the reasons for the fundamental changes in household organization that occurred during the Pithouse period, the implications that these have for understanding the initial development of pueblos, and the reasons for the variability in households that are seen at different Classic period pueblos across the Mimbres region and through time.

[84] *Chair*

Roth, Barbara [303] see Romero, Danielle

Rots, Veerle [40] see Coppe, Justin

Rougier, Atiba (Existential Anthropologist)

[139] *The Politics of Death: An Anthropological Excavation of Political Ascension through the Strategic Manipulation of Postmortem Bodies as Objects to be Used, Misused, and Abused—and the Historic Ghost We’ve Inherited, Materially and Immaterially*

Three kinds of postmortem manipulations occur for three distinct reasons. They are connected by the need for authoritative power and the desire to be seen as strong. Selfish notions of self-preservation are manifested through governmental bodies in the name of freedom and evolution. The three kinds of postmortem configuration can be categorized like this: A) political ascension; B) national or geographic control and domination; C) reactive exclamations, usually performed by the powerless and the oppressed. I will excavate the historic realities of similar political occurrences and their strategic engineering of death and the bodies of the dead. The examples are 1) the death of Caesar, AD 44; 2) the deaths of Zulfikar Ali Bhutto, 1979, and Shanawaz Bhutto, 1985; 3) the deaths of Che Guevara, 1967; Maurice Bishop, 1983; Bin Laden, 2011; 4) the deaths of 9/11 victims at ground zero, 2001; and 5) the deaths of military service officers: Black Hawk Down, 1993, and Iranian hostage crisis, 1980, and the Russian pilots in Syria, 2015. Focus will be placed on the deaths themselves, the manipulated funeral arrangements by the State apparatus, the demagogic eulogies, and the political aftermath—the postmortem body is a symbol to be used, misused, and abused.

Rousseau, Mélanie [285] see Bain, Allison

Roussel, Morgan [169] see Rendu, William

Rowan, Yorke [57] see Hill, Austin

Rowe, Marvin [392] see Desrochers, Marie

Rowe, Robert**[307]** *Prehistoric Mining in the High Mountains of Northern Colorado*

Rupturing and buckling of fissures along the present valley of the Colorado River in Middle Park, Colorado, during the Miocene resulted in thick deposits of tuff and flow basalt which resulted in the Troublesome Formation. The Troublesome Formation primary consists of weakly consolidated siltstone, minor interbedded sandstone and conglomerate, and locally unconsolidated sand and gravels, and chalcedonies. As the result of the chalcedony filtering through the tuffaceous linear deposits of jasper immediately beneath the tuff were formed. The Granby Site (5GA151) is a prehistoric mining site, whose knowledge of the area has been passed down for at least 11,000 years, from Goshute to Ute. The location of the mining site on the toe of a basalt flow that has been tilted by tectonic forces brought three deposits of jasper to the surface enabling the material to be mined. A recent project on the Granby Site enabled the site to be studied and to identify numerous purposely shaped "tabs" of jasper. These tabs enabled easy transport of the mined material away from this high altitude mine. The jasper material was traded up and down the Colorado River valley and became a major source of toolstone for over a millennia.

Rowell, Kirsten [49] see Salter, Natasha

Rowland, Kenneth [89] see Parish, Ryan

Rowley, Susan (Museum of Anthropology), Leona Sparrow (Musqueam Indian Band), Jordan Wilson (Musqueam Indian Band), Larissa Grant (Musqueam Indian Band) and Jason Woolman (Musqueam Indian Band)

[17] *"Rerighting" History—čəsnaʔəm: The City before the City*

čəsnaʔəm is an ancient Musqueam village and cemetery located in what has become contemporary Vancouver. Over the past 125 years, archaeologists, collectors, and treasure hunters have mined čəsnaʔəm for artifacts and ancestral remains for their collections. The land has also been given various names since colonialism, including Great Fraser Midden, Eburne Midden, DhRs-1, and Marpole Midden. Today, intersecting railway lines, roads, and bridges to Vancouver Airport obscure the heart of Musqueam's traditional territory, yet čəsnaʔəm's importance to the Musqueam community remains undiminished. In 2012 čəsnaʔəm became the subject of public controversy and debate when burials were exposed during construction. This led to a 200+ day community vigil at the site and eventual purchase of the property by Musqueam. Intense public debates took place about the rights of private property holders versus the rights of Indigenous communities and the very nature of public space. Who defines heritage? Who decides what is preserved? Whose heritage is celebrated? čəsnaʔəm: the city before the city is a series of three museum exhibitions pointing to the city and histories of development with a new lens. In this talk we discuss the role of community voice and public archaeology in this exhibitions.

Rowsell, Keri and Matthew Collins (University of York)**[96]** *Simple Nondestructive Extraction of Biomolecules from Human Skeletal Remains*

Opportunities for the biomolecular study of archaeological human skeletal remains (HSR) can often be limited by museum regulations that only permit nondestructive analyses. This restriction, coupled with the fairly common practice in England of quick reburial (due mainly to a lack of storage space), can result in a wealth of information being lost. It is therefore important that bioarchaeologists work to establish successful nondestructive methods for the biomolecular analysis of archaeological remains. This paper reports the development of a nondestructive technique for the extraction of collagen from HSR, which has been tested against traditional collagen extraction techniques, in order to establish its relative effectiveness. This technique has subsequently been applied to over 200 post-medieval samples from London, England, where access for sampling and destructive analysis would otherwise have been refused. The eventual aim is to use the collagen extracted from these individuals to study human health and dietary deficiencies in England during the late eighteenth century.

Rowsell, Keri [85] see McGrath, Krista

Royle, Thomas (Simon Fraser University) and Dongya Yang (Simon Fraser University)**[258]** *Ancient DNA Analysis of Fish Remains from Charlie Lake Cave (HbRf-39), British Columbia, Canada*

Excavations of Charlie Lake Cave (HbRf-39) in northeastern British Columbia, Canada, have recovered well-preserved faunal remains from stratified deposits that span the Late Pleistocene and Holocene. These remains represent a variety of taxa, including amphibians, birds, fish, mammals, and reptiles. A previous morphological analysis of the fish remains from the site (n = 1,235) identified the majority of the fish remains as sucker (*Catostomus* sp.) (n = 669). Due to bone fragmentation and other challenges associated with morphology-based species identification, only a small number (n = 20) of the remains were identified to the species-level. To facilitate the identification of more of these fish remains to the species-level, we used ancient DNA analysis to assign species-level identifications to a sample of fish remains from Charlie Lake Cave. These data will aid in investigating temporal changes in the species composition of the assemblage of fish remains from the site. In addition, we sought to use ancient DNA analysis to document temporal changes in the population structure of the fish species represented at the site. By documenting these kinds of temporal changes, this research can shed light on the dynamics of the complex relationships between fish, people, and the environment over the longue durée.

Rozwadowski, Andrzej (Institute of Eastern Studies, Adam Mickiewicz University)**[28]** *Embodied in Contemporaneity: Negotiating Identity through Rock Art in Contemporary Siberia and Central Asia*

Along with the collapse of the Soviet Union, Indigenous people in Siberia and Central Asia began to pay more attention to their past, which since then has been vigorously explored as a source of cultural identity. Particularly interesting aspect of this process concern contemporary use of prehistoric rock art. In the presentation I will refer to different contexts of such uses, which imply negotiating of the identity. Basing on the examples, I will show that rock art in Siberia and Central Asia is a real part of contemporary culture, that it actively influences everyday life and is used politically, socially and artistically. I will pay a particular attention to contemporary art, a very new phenomenon, where artists consciously adapt rock art imagery to manifest their link with ancestral past. All of the issues explored in the paper will demonstrate that prehistoric rock art in Central Asia and Siberia is embodied in contemporaneity.

Rubin, Julio Cezar [62] see Silva, Rosicler

Rubino, Darrin [249] see Strezewski, Michael

Ruby, Bret J. [53] see Weiland, Andrew

Ruebens, Karen

[169] *Discussant*

[169] *Chair*

Ruehli, Frank [219] see Breidenstein, Abigail

Rugiero, Ana [328] see Aguilar, Felisa

Ruhl, Erika (University at Buffalo), Sarah E. Hoffman (University at Buffalo), Christopher B. Troskosky (University at Buffalo), Torill Christine Lindstrøm (University of Bergen) and Ezra B.W. Zubrow (University at Buffalo)

[90] *Do Good Fences Make Good Neighbors? Pilot Osterøy Field Project (PILOST) and Redefining Boundaries in Southwestern Norway*

PILOST is an archaeological survey of southwestern parts of the Island of Osterøy, Norway, focusing on the changes in landscape enclosure (ideologies?) practices as well as settlement and burial patterns from the Neolithic through the Historic Periods in southwestern Norway. This project examines a unique form of human landscape manipulation through time, taking different forms than those observed elsewhere in Scandinavia. The first field season of PILOST (summer 2016) initiated extensive field survey, with subsequent seasons in the planning stages in summer 2017 and beyond. GPS units were utilized to both track survey progress and create GIS maps of the surveyed areas. This continuing project further informs wider archaeological understandings and discussions regarding not only land use and ownership through time, but the interpretation of and attachment of fishing-farming communities to the archaeological landscape. The dataset includes over 145 distinct landscape features, consisting primarily of walls, fences, and other boundary markers. These features were identified based on their potential utility to document and inform a discussion of the evolving nature of boundaries, in/outfield usage, and land ownership within fishing-farming communities throughout prehistory, history, and the modern era.

Ruiz Giralt, Abel [274] see Lancelotti, Carla

Ruiz-Redondo, Aitor (Univ. Bordeaux, CNRS, PACEA—UMR5199, Pessac [France])

[165] *Symbolic Behavior at the End of the Paleolithic: A View from Cantabrian Region Rock Art*

In the field of graphic activity, the recent Magdalenian (14,500–11,500 BP) is characterized by a homogenizing process along a vast territory in southwestern Europe. It also represents the most splendid rock art period and, at its end, figurative graphic activity suddenly disappears from Europe for millennia. A representative assemblage of recent Cantabrian Magdalenian rock art sites has been studied. The results of this research led to the discovery of several unpublished figures and reinterpretations of an even larger number of graphic units. Most importantly, they form a body of data large enough to produce statistically significant information. This can be used to define guidelines about the symbolic behavior of the populations that inhabited the Cantabrian region during that period. This communication summarizes the main results and presents a brief discussion about the implications of these data in the social and cultural context of Late Pleistocene populations in southwestern Europe. The conclusions reveal the existence of rich graphic activity that reflects complex societies with large exchange and social networks, including cultural elements within a common realm of ideas that covered many hundreds and even thousands of kilometers at the end of the Pleistocene.

Rumberger, Jacklyn (University of Central Florida), Sarah Barber (University of Central Florida), Arthur Joyce (University of Colorado, Boulder), Tosha Dupras (University of Central Florida) and Stacie King (Indiana University, Bloomington)

[82] *Diet and Migration in Coastal Oaxaca: Identifying Effects of Political and Social Collapse through the Utilization of Stable Isotope Analysis*

This study reports on diet and mobility among people living in the lower Río Verde Valley, Oaxaca, Mexico, during the Late Classic (AD 500–800) and Early Postclassic (AD 800–1200) periods, specifically focusing on how political and social collapse affected subsistence practices, diet, and human migration. Archaeological evidence suggests that Río Viejo, the region's largest urban center before AD 800, experienced multiple periods of political fragmentation and instability during its long history, specifically during the Early Classic (AD 250–500) and Early Postclassic periods, making it an ideal place to test these relationships. Stable carbon, nitrogen, and oxygen isotopic analyses of human bone and tooth samples were used to reconstruct diet and migration history. Samples were extracted from the skeletal remains of twelve Late Classic and eleven Early Postclassic individuals. Stable carbon and nitrogen isotopes provided insight into maize consumption. In addition, nitrogen values indicated the exploitation of aquatic resources. Stable oxygen isotopes determined whether individuals were locals, travelers, or foreigners. Results demonstrate collapse following the Classic period led to a dietary shift that included a wider variety of resources, specifically aquatic. Human mobility also increased during this time and suggest movement within the valley and along the coast.

Runnels, Curtis (Boston University)

[180] *Pleistocene Occupation of the Greek Islands: The Perspective from Crete*

Paleolithic stone tools have been identified on a number of Greek islands recently. These include the oceanic island of Crete, where lithic artifacts on the southern coast at Plakias occur in association with raised marine beaches and paleosols in karstic depressions dated to > 130 kyr, and on the northern coast at Mochlos Bay associated with as-yet undated Pleistocene alluvial fans. Other islands, including Ayios Efstratios, Alonissos, Gavdos, Kephallonia, Lesbos, Melos, and Naxos, have also produced documented Paleolithic materials, although excavations have taken place only on Lesbos at the site of Rodafnida (Lower and possibly Middle Paleolithic) and Stelida on Naxos (possibly Lower and Middle to Upper Paleolithic). Although Lesbos was connected to the mainland during most of the Pleistocene, other islands were separated by open sea. Crete in particular required a substantial sea crossing (or several moderate crossings) to be reached from the mainland at any time. These facts suggest two topics for future research: that hominins were present on many of the larger islands in Greek waters as early as the Middle Pleistocene, and that the sustained presence of hominins on some islands, notably Crete and Naxos, implies the ability of archaic hominins to make open-sea crossings.

Rusch, Bruce (NH SCRAP; University of Exeter)

[16] *Settlement Organization of Paleoindian Caribou Hunters: Inferences from the Other Side of the Valley—The Potter Site, Randolph, New Hampshire*

In the Northeast and especially New Hampshire, Paleoamerican small lithic sites or scatters represents one of the most common site types. Even though represented by small lithic scatters some of these sites also contain evidence of short-term habitation, food preparation and tool production activities. Twenty km to the east, opposite the Israel River Complex, is situated a site with an area of 2.5 acres, 11 excavation units (1 m × 1 m or greater), and

approximately 15,900 lithic artifacts, known as the Potter site (27-CO-60). This portrayal suggests similarities between the Potter, Whipple and Bull Brook regional sites manifest in terms of the significant number of "hotspots" or loci, rarity of its large size, earliest fluted point styles, low number of lithic material sources, rich artifact assemblages, site positioning overlooking a remnant of a glacial pond, and a chokepoint topography. As characterized by earlier researchers, was Potter a large single occupation marshaling or hunting aggregation; or alternatively, a seasonal social aggregation site type, or something altogether different?

Rush, Jamison (Beloit College)

[193] *A Queer Reframing of Gendered Archaeological Theory*

Archaeologists must move beyond outdated paradigms of biological sex as an objective and cross-culturally applicable category, even when presented distinctly from gender. These paradigms prevent recognition of gender's full variation, and exclude those outside of Western gender ideology from participation in research. To move toward a more inclusive gender archaeology, I propose that culturally-specific definitions of gender replace these epistemologies to prioritize emic viewpoints. I critically analyze the strengths and shortcomings of theoretical perspectives on gender that previously attempted to decolonize ethnocentric sex and gender conceptions. To further develop these theories, I recommend identifying and distinguishing gender assigned culturally and gender assigned archaeologically, with the goals of respecting cultural and individual agency as well as being cross-culturally relevant. To achieve this, I propose two complementary modes of gender categorization. This ontological reconceptualization maintains a standard of classification and incorporates culturally specific models of gender when available. Multiple cross-cultural case studies, including reanalysis of the Vix grave, substantiate this method and show applicability in practical contexts. Decoupling gender assigned at birth and gender assigned after death creates a powerful tool which, in its implementation, serves to establish scientific thought as a culturally specific method itself.

Russ, Jon (Rhodes College), Ryan Hunt (Rhodes College) and Natalie Prodanovich (Rhodes College)

[364] *Organic Analysis of Smoking Pipe Fragments and Residue Scrapings*

Chemical analysis of organic residues from archaeological artifacts is shedding new light on past human activities. Here we report on the residue analysis of smoking pipe fragments and residues scraped from pipe sherds. Our goals were twofold: 1) to ascertain whether nicotine was present in the residues, thereby providing a positive indication for tobacco use; and 2) to identify the presence of other biomarkers that would allow us to establish which other plants were smoked, furthering our understanding of the natural resources exploited for religious activities. Our samples included residue scrapings from Woodland and Mississippian period pipe sherds collected at the Glass Site (9TF145) in Telfair County, Georgia. We also analyzed pipe fragments from the Feltus Mound Site (22JE500) in Jefferson County, Mississippi, considered to be from the Late Woodland period. Our methods included methanol:chloroform solvent extractions using ultrasonication to isolate the organic compounds in the residues. Our analysis utilized both gas chromatography-mass spectrometry (GC-MS) and gas chromatography flame ionization detecting (GC-FID). The results demonstrate the presence of nicotine in many of these artifacts, along with other compounds that could signal the existence of a complex smoking tradition among indigenous populations of the southeastern United States.

Russ, Jon [173] see Carmody, Stephen

Russell, Anthony (University of Glasgow)

[166] *Globalization in the Bronze Age? In Search of a Metaphor of Connectivity in the Central Mediterranean*

The world in which native Sicilians and Sardinians exist in the second half of the second millennium BC is an increasingly connected one. As we move beyond static, binary, and often unidirectional frameworks for assessing social and material change (e.g., "acculturation"), beyond the entrenched categories of "Mycenaeans" or "Cypriotes" vs. "natives," there is an opportunity to explore new analytical avenues to describe or explain the sociocultural shifts that occur on these two islands. In this presentation I will propose that certain aspects of modern globalization studies—recently applied to debates concerning Romanization, Hellenization, or Iron Age Orientalization—may also work as an acceptable metaphor for the cross-cultural consumption of goods and ideas that we encounter as the Bronze Age winds to a close. Even without the hyper-connectivity or an existing single cultural framework that later periods can claim, examining modern globalization "in action" can inform us about material changes and social reconstructions at the beginning of the Mediterranean connectivity story.

Russell, Bradley (College of Saint Rose)

[321] *All the Gods of the World: Modern Maya Agricultural and Rain Ritual in Yucatán, Mexico*

The modern residents of Yucatán, Mexico blend traditional Maya beliefs in a pantheon of ancient gods and other supernatural forces with more recent Catholic traditions flowing from centuries of Spanish colonial influence. This paper compares and contrasts modern rituals from the Yucatec Maya village of Telchaquillo, Yucatán. Each rite was associated with a local cenote, limestone sinkholes that along with caves serve as access to the Maya underworld and homes to the gods themselves. My research suggests considerable cultural continuity with the ancient residents of the Postclassic Maya center of Mayapán where cenotes were regularly paired with important ritual architecture and sometimes contain human remains and other indications of ritual activity. The ceremonies documented in this paper provide information about Maya cosmology, gender roles and long held beliefs about cenotes and agricultural fertility.

Russell, Glenn (County of Santa Barbara) and Christopher Attarian (Baker College of Owosso)

[382] *The Chicama Valley Archaeological Project (1989–2000) Revisited*

Between 1989 and 2000, the Chicama Valley Archaeological Project, led by Glenn S. Russell, Banks Leonard, and Christopher Attarian, conducted archaeological survey and excavations in the lower Chicama Valley. This presentation will focus on a broad summary of settlement pattern change with reference to key excavation data that informs interpretation of the survey data. A focus will be how sociopolitical complexity developed in the context of control of irrigation systems. Approximately 25% of the lower valley was surveyed, resulting in the recording of over 200 archaeological sites and features. Key settlement pattern changes discussed include the emergence of defensive settlement in the Late Intermediate Period, the shift to the site of Mocollope as a primary valley floor monumental site by Gallinazo through Moche occupation, and the emergence of a major polity in the lower valley during the pre-Chimu period as evidenced by a cluster of several of the largest Huacas constructed in the valley.

Russell, Nerissa (Cornell University)

[95] *Wild Meets Domestic at Neolithic Çatalhöyük, Turkey*

One of the classic ways the nature/culture dichotomy manifests itself in human interactions with the environment is through the categories of wild and domestic. Some have argued that this distinction is not helpful, and certainly the boundaries are complicated, but it seems most useful to start by asking whether it was meaningful to particular people in the past. Here I will explore whether wild and domestic were relevant concepts to the inhabitants of Çatalhöyük (Central Anatolia), and to some extent in the Neolithic Near East more generally, in their relations with animals. I will argue that this was in

fact a crucial distinction that shaped economic choices as well as ritual activities. Differential treatment of wild and domestic animals indicates that they were accorded different forms of personhood. The intensity of human relations with wild cattle in Central Anatolia engendered active resistance to herding domestic cattle for several centuries. This was not an issue for sheep and goats in Central Anatolia, nor, apparently, for cattle further east.

Russel, Scott [142] see Motta, Laura

Russell, Will (Arizona State University), Sarah Klassen (Arizona State University) and Katherine Salazar (Arizona State University)
[23] *The Presence and Potential Representation of Turquoise at the Mimbres Site of Galaz*

Turquoise, both the mineral and the color, are inexorably linked to contemporary ideas of the indigenous Southwest. Without doubt, the importance of turquoise extends back into prehispanic times, although we know relatively little about its cultural significance. The mineral turquoise may also have been represented in a more abstract way; J. J. Brody and Stephen Plog have suggested that Chacoan contemporaries of the Mimbres tradition may have used hachured elements on pottery to represent the color turquoise. In this paper, we examine the distribution of both hachured pottery and actual turquoise from nearly 1,000 Mimbres burial assemblages to understand whether this conceptual association extended to Mimbres ceramics. We also analyze the distribution of turquoise artifacts and hachured pottery from mortuary assemblages to determine whether they were preferentially associated with a particular social group or class. Our findings, which intersect with Puebloan ethnographic data, contribute to the study of Mimbres inequality, identity, and exchange, as well as the situation of Mimbres society within a larger social landscape.

Russell, Will [23] see Shepard, Lindsay

Rust, William (Athena Review)

[76] *Evidence for Complex Society at Middle Preclassic La Venta Settlements*

In the past, abundant ceremonial evidence found at La Venta and other Gulf Coast Olmec sites has spawned widely ranging views on the emergence of complex society in Mesoamerica. Evidence of dense local riverine settlement was gained from my survey at La Venta and surrounding sites in 1986–1987, revealing household sites both on La Venta and surrounding villages on abandoned river courses. The chronological sequence has been guided by over 50 radiocarbon dates recovered from a series of domestic features which range from ca. 3050–350 cal BC. Findings of house floors, refuse pits, caches, and workshops as well as burials and offerings revealed specific distributions of pottery, figurines, and both ceremonial and utilitarian lithics. Several basic trends in long-term settlement evidence show an in situ emergence of complex society around La Venta. By the Late La Venta 2 subphase (ca. 650–350 cal BC), a local three-tier settlement hierarchy had evolved, with some riverine sites with small central mounds, fine paste pottery, figurines, and jade. Other village sites, however, lacked central mounds, had few figurines, and little fine paste pottery or carved jade. During the same time frame, when local riverine settlement peaked, maize use at all sites was accelerated.

Rutecki, Dawn (Grand Valley State University)

[197] *Entangled Complexity: Spiro, Religion, and Food*

Understanding past peoples—those living in different places, spaces and times—requires archaeologists to reorient how we see and experience the world. We have the ability to move beyond recording the physical traces of past lives to get to the central goal of our discipline—understanding how people lived, participated in and tied themselves to communities, and connected to larger systems. Instead of forming stagnant images of the past, we need to remember the dynamism of choices made and changed in an individual's and a community's continual process of becoming. Through analysis of subsistence data, evidence of religious practices, and ethnohistoric accounts, this paper discusses the lives of people in the Spiro community, Oklahoma, circa AD 1000–1450. It explores the relationships between food and religion to situate how North American archaeological theoretical frameworks can renegotiate their place in the past. I argue that through applying a critical lens, we can usefully expand how we conceptualize social complexity and develop a more nuanced understanding of how these entangled social relationships remain fluid, living connections.

[109] *Discussant*

Rutherford, Cady [83] see Cortes-Rincon, Marisol

Ruuska, Alex (Northern Michigan University)

[175] *Memory and Materiality in Rock Art and Ghost Dance Performances*

In this paper, I examine the materiality of memory practices as expressed in rock art associated with the Ghost Dance in the Great Basin, Colorado Plateau, and Eastern California. Building on Jeff Malpas's (2010) claim that "place is perhaps the key term for interdisciplinary research in the arts, humanities, and social sciences in the 21st C." (Creswell 2015:1), and Susan Kuchler's perspective of "landscape as memory" in which embodied experiences "govern the mnemonic transmission of land-based relationships" (Bender 1995:86), my paper explores embodied ontological, epistemological, and discursive relationships between and among people, places, and the land.

Ruvalcaba, Jose Luis [349] see Hernandez, Hector

Ryabogina, Natalia (Institute of the Problems of Northern Development, Russian Academy of Sciences) and Robert Spengler (Institute for the Study of the Ancient World, New)

[388] *Archaeobotanical Chenopodium Seeds from across Central Asia*

Plants in the Chenopodium genus have attracted human interest around the globe for millennia; they have been used for grain and vegetable food as well as being a key forage plant for herd animals. Historically, several wild species have been economically significant across Eurasia, notably in Central Asia, and the genus has been domesticated in various parts of the world, including East Asia. Wild Chenopodium seeds are the dominant category of archaeobotanical remains found in the vast majority of archaeological sites across Central Asia. Scholars working in Central Asia continue to discuss the possible economic significance of these remains and what use they are for understanding paleoecology and anthropogenic landscape change as well as human and herd animal diet. In this talk we will present a summary of this Chenopodium data and discuss the ongoing debates in Central Asia.

Ryan, Ethan, Pei-Lin Yu (Boise State University) and Matthew Schmader (City of Albuquerque)

[50] *Household Hearth-Centered Activity Areas and Cache Pit Patterning at the Bridge River Site*

Archaeological investigations at Housepit 54 within the Bridge River site have, to date, exposed seventeen discreet floors primarily dating to ca. 1500–1000 cal. BP. In this poster we draw data from three of the site's floors, IIk, III, and IIIm, where the most recent investigations have yielded an interesting pattern of hearth and cache pit features. Questions will be addressed specifically toward formation processes as well as the potential relationships between the patterning of hearth-centered activity areas and nearby cache pits by examining variability in artifacts, faunal remains, and other features. Using the same methodological and theoretical approach for each floor, we examine feature form and function, lithic tool production and maintenance, animal and plant processing, taphonomic processes, and potentially, ritualistic practices to reconstruct the means by which the items in each activity area came to be co-associated. From these studies, we draw conclusions regarding the roles of these spaces on the house floor. We then seek to address potential relationships between activity areas by application of re-fitting analysis and examination of inter-assemblage variability. Results of this research permit us to develop a range of implications regarding household occupational history and sociality.

Ryan, Susan (Crow Canyon Archaeological Center)

[266] *Architectural Communities of Practice: Identifying Kiva Production Groups in the Northern Southwest*

Researchers in a number of fields have come to recognize the vital importance of the built environment not only as material culture, but as symbolic expressions of the larger cultural framework through which social relations are produced and reproduced. Over the last half-century, studies have demonstrated how architectural characteristics—such as building size, shape, and the presence of various architectural materials, features, and furnishings—have a direct influence on human behavior and interaction and are material manifestations of worldview ideologies. One of the most important functions of the various elements within a structure is the encoded messages that convey group identity and provide clues into ancient social organization. This paper will analyze ancestral Pueblo vernacular architecture from the Pueblo II (AD 900–1150) and Pueblo III (AD 1150–1300) periods in the northern Southwest in order to shed light on communities of practice and their social, temporal, and spatial production techniques. This research examines public and residential kivas—or round rooms used for communal and domestic activities, respectively—to address how architecture emphasized the ways in which structures were actively mediated by production groups, and how their architectural signatures reflect identity during periods of population aggregation and dispersal.

Ryan, Thomas (City University of New York Graduate Center)

[190] *Using Multidimensional Analysis for the Presentation of Zooarchaeological Data*

Management and dissemination of data has long been a challenge for archaeologists, and this challenge has increased in recent years with demands from various funding agencies for data management plans. Additionally, querying the complex datasets generated often results in iterative rounds of SQL code creation as each answer raises further questions. Online analytical processing (OLAP), a tool for multidimensional analysis used by many private companies for reporting, management, and forecasting, as well as by government agencies, such as the Department of Labor, to track the effectiveness of their programs, provides a possible solution to the difficulties in data management and querying in archaeology. Defining data in terms of dimensions and measures, OLAP allows rapid and complex querying without a developer anticipating the specific questions a researcher may ask. I will demonstrate the effectiveness of this tool for analyzing data using zooarchaeological data from the North Atlantic region. Using OLAP to present such data also can serve as an aid in outreach efforts to policy makers and researchers in related fields. The ability to integrate disparate datasets and create complex queries in an ad hoc fashion will also be shown.

Ryan, Timothy M. [151] see Hilson, Heather

Sablin, Mikhail [127] see Germonpré, Mietje

Sabo, George [87] see Hammerstedt, Scott

Sabol, Donald [250] see Buck, Paul

Sacharuk, Jasmine

[72] *Late Shang Cooking and Cooking Technology from Yinxu, China*

A great deal of effort has been dedicated to developing detailed ceramic chronologies at the late Shang capital of Yinxu (ca. 1200–1045 BCE) in China, but there has been comparatively less focus on the specific, actual uses of ceramic vessels and the roles that they played in the day-to-day life of Shang citizens. Local cooking practices and cooking technology in particular, both of which are key aspects in household dynamics and cultural identity, hold the potential to reveal important information about the daily lives of Shang residents as well as regional variability during the Shang period. This paper explores Shang cooking technology by conducting microstructural comparisons of li cooking vessels from three different Shang sites, highlighting the impact of local resources on ceramic technology despite stylistic similarities. This paper also discusses cooking-related finds excavated in May 2016 from a refuse pit at Dasikongcun, a residential locus of Yinxu, and presents use-wear analyses for li cooking vessels found at the site that may indicate particular cooking practices. This paper highlights the need for further investigation of cooking vessels at differing Shang sites as a method of exploring both daily life and regional variability during this period.

[72] *Chair*

Sadongei, Alyce

[138] *Engaging Tribal Relations and Tribal Collections*

The use of museum collections by tribal researchers began as a result of cultural and political efforts. The combined movement of cultural resurgence and political expression culminated in the passage of NAGPRA which provided entrée for a variety of tribal researchers and practitioners to engage with cultural objects and archival information. Since the passage of NAGPRA, tribal researchers have primarily been focused on the eligible categories of museum collections for repatriation. However, museum collections have increasingly been used to re-enforce cultural identity by validating tribal memory of emergence, replication of cultural items and revitalizing Native languages. Thus museum collections as a source of cultural information have gained in importance for tribal communities. Access and use of museum collections by tribal researchers requires navigation and negotiation of western museum standards for collections management. This presentation will discuss how tribal researchers are using museum collections to further community goals of cultural maintenance and survival while offering a glimpse of how tribal nations respond to standard museum collections care. By understanding the subtle complexities that tribal researchers face when engaging with museum collections non-tribal museum curators and other professionals will increase their ability to facilitate mutually beneficial collection based research visits.

Særheim, Inge**[282]** *Words for Domestic Animals Used as Metaphors in Coastal Naming*

Place-names are important sources to understand and reimagine past conceptions of the landscape. Toponyms map animal lives on to the landscape. In some cases, however, words for animals—wild as well as domestic—are used as metaphors. In some names denoting sunken rocks along the Norwegian coast, e.g., Sugga ('sow'), Oksa ('bull'), Hesten ('horse'), Porthunden ('watchdog'), the words either refer to the shape or sound of the locations, or to some special circumstances, e.g., dangerous rocks in the sailing route. The names serve as warning to boatmen. Words for animals were earlier taboo among Norwegian fishermen (who were also farmers). At sea they would instead use other words and names (noa) for the animals and the locations. Special behavior was linked to some locations, e.g., to sting a pig or roar like a bull. The grammatical form indicates that some names date back to medieval times. Similar names of Old Norse origin are found in Viking settlements in the North Atlantic area. This paper discusses how words for domestic animals are used as metaphors in coastal naming, and how this type of naming reveals special traditions and conceptions among fishermen and sailors.

Safi, Kristin (University of Tennessee Knoxville)**[59]** *A Costly Signaling Model for Chacoan Great House Construction*

Peer polity interaction has been suggested as a primary driver of interaction among communities with Chaco-style great houses. Unfortunately, the peer polity model lacks underlying theory and therefore using it to empirically examine the relationships between great house groups is difficult. We propose instead that costly signaling theory is a better framework for evaluating the construction of these monumental structures, the ritual or group level activities associated with their use, and patterns of interaction among great house communities. This presentation details where the model fits well with existing great house community datasets and where we are lacking crucial data lines necessary to develop more robust empirical tests for costly signaling as applied to the Chacoan Southwest, and to archaeological phenomena more broadly.

Safi, Kristin [130] see Dungan, Katherine

Sagebiel, Kerry and Helen Haines (Trent University)**[321]** *Ancestors, Agency, and Formation Processes: Interpreting Problematical "Smash and Trash Deposits" at Ka'Kabish, Belize*

Maya archaeologists commonly discover "smash-and-trash" deposits, collections consisting of large quantities of broken sherds, lithics, faunal materials, and other remains, in varying contexts on Maya sites. Interpretations of these deposits vary from simple trash or midden deposits, to remains of feasting, to termination and other rituals. These interpretations are often strongly influenced by the theoretical and analytical approaches taken by the excavators. At Ka'Kabish, Belize, a series of problematical "smash-and-trash" deposits, consisting primarily of sherds and reconstructible vessels, were encountered in Plaza D South. This paper will explore how the application of different analytical and theoretical approaches to these deposits can influence how they are interpreted, and attempt to provide insights into which approaches are most reasonable for analyzing and explaining these kinds of deposits.

Sagebiel, Kerry [3] see Haines, Helen

Sagiya, Elton Munyaradzi [20] see Pikirayi, Innocent

Sailors, Damion**[380]** *Mapping Island "Moka": Assessing the Spatial Patterns of Customary Fishing Weirs in the Fiji Island Group*

Customary Fijian fishing weirs, known locally as "moka," are an archaeological feature type that can be readily identified due to their large size, uniform shape, and conspicuous location on the tidal flats and shorelines of both high and low islands. Recent advances in remote sensing technology have allowed for an improved survey of Fijian fishing weirs adding to the existing inventory and informing upon early settlement patterns in the Fiji Island group. While "moka" do not play a major part in the local economy today, they likely served a significant role in early Fijian subsistence and knowledge of this customary practice is valuable to current socioenvironmental studies. This paper will discuss the preliminary results of an archaeological investigation that utilized satellite imagery and kite aerial photography, along with pedestrian survey, to map 683 customary fishing weirs on 79 Fijian islands. The spatial configurations and physical characteristics of these fishing weirs have been documented and are being explored statistically at the regional and island scale as part of a doctoral thesis in order to better understand Pacific Island settlement patterns as they might apply to cultural adaptation, social complexity, and human evolution in an island-coastal setting.

[380] *Chair*

Sailors, Damion [180] see DiNapoli, Robert J.

Saintenoy, Thibault (CIHDE-CONICYT [Chile], ARCHAM-CNRS [France]) and Mauricio Uribe**[202]** *Water, Mines, and Wak'a at Belén Valley in the Highlands of Arica: The Inca Making of a Central Place within the Andean Transect of Arica and Parinacota (18°S)*

Located on the edge of the Atacama Desert at the foot of the Carangas Altiplano, the Belén Valley witnessed substantial construction of imperial infrastructures during the late prehispanic period. The Inca occupation was mainly related to agriculture, metallurgy and a sanctuary. The Belén Valley contains, in fact, the most important water resources in the upper basin of Azapa, copper and tin mines and an important mountain summit, which formed both economic and symbolic resources of special interest for the Empire's political economy and religious purposes. In addition to explaining the characteristics of the Inca occupation at Belén based on the results of recent archaeological research, this presentation will develop a multi-scalar perspective to identify the specificities of the territorial situation of Belén, following a comparison with the Inca occupation of the surrounding areas: the Carangas Altiplano, the coastal valleys of Arica, and the Tacna sierra.

[202] *Chair*

Saintenoy, Thibault [134] see Sepúlveda, Marcela

Sakaguchi, Takashi**[211]** *Evolution of Feasting among Jomon Societies Based on Wooden Artifacts*

Cross-culturally, wooden items such as bowls, ladles and spoons play an important role as ritual offerings to deities and ancestors. Thus, they are keys to understanding feasting and ritual activities, and can provide archaeological signatures of these activities. This paper explores evolution of feasting among Jomon societies focused on the analysis of wooden artifacts. The analysis is based on three sources of information: 1) temporal and spatial distribution; 2) stylistic analysis; and 3) archaeological contexts. For the analysis, a database was created, based upon such attributes as archaeological context, wooden vessel form, and presence/absence of decoration, which were obtained from published sources. This database provides invaluable information to assess the number, type, and context of wooden artifacts throughout the Japanese archipelago. Although the most of wooden artifacts represent secondary deposition, items found in housepits, burials, storage pits, and elsewhere suggest temporal and spatial variability of feasting among Jomon societies.

[211] Chair

Sakai, Sachiko (California State University Long Beach)

[155] *The Reevaluating Diachronic Trends of Corrugated Ware and Rim Eversion of Jars in the Virgin Branch Ancestral Pueblo Ceramics Using Optically Stimulated Luminescence (OSL) Dating*

Although the ceramic chronology in the Virgin Branch Ancestral Puebloan area requires more well-dated ceramic assemblage, there are some generally accepted diachronic trends based on surface treatment and form. Corrugated ware, for example, is believed to date around AD 1050. Rim eversion of jar is also often used as time indicator; sharply everted rim is considered to be associated to later time period, and little or no everted rim is associated to earlier time period. This information may be useful for assessing the general site chronology, especially at the first stage of the survey. However, many more well date ceramic assemblages without ambiguous assumption are necessary to confirm these diachronic trends. The use of radiocarbon dating, however, is not the ideal option in the Mt. Trumbull area, as many sites in this area were occupied by multiple generations and few radiocarbon dates have been generated. This is in addition to the ambiguity of applying radiocarbon dating of organic remains to determine the age of associated ceramics. Thus, in this study, I apply optically stimulated luminescence (OSL) dating, which dates ceramics directly, to corrugated ware and rim sherds from Mt. Trumbull to reevaluate these proposed diachronic trends of the region's ceramics.

Sakai, Sachiko [182] see Neff, Hector

Salazar, Julian (Universidad Nacional de Cordoba—CEH Segreti—CONICET)

[278] *Household Dynamics and the Reproduction of Early Village Societies in Northwest Argentina (200 BC–AD 350).*

Long term evolutionary narratives on South Andean precolumbian history have stressed lineal processes of complexity intensification, defined by big changes on subsistence strategies, from small and egalitarian hunter-gatherer groups to complex multicommunitarian chiefdoms. These changes were thought to influence or even determine the structure of household and consequently daily life of people. Nevertheless recent household archaeology studies have demonstrated that the reproduction of quotidian practices within specific material settings were creative scenarios where the whole society was created, reproduced or challenged. In this contribution I present new researches on early villager settlements from the eastern slopes of the South Andes addressing the material dynamics of houses and the constitution of collectives which allowed the formation of early villages. Rather than being determined by mandatory structural or subsistence forces, society was continually created and reproduced within the material mesh of daily life and household relationships. On the other hand, these performative creations were not multiple free willing actions but defined by the long history of other precedent material meshes. This dialectic dynamics shaped early villages at multiple scales.

Salazar, Katherine [23] see Russell, Will

Salazar Chavez, Victor Emmanuel (George Washington University) and Jeffrey Blomster (George Washington University)

[293] *Early Formative Public Architecture and Corporate Identity in the Mixteca Alta, Oaxaca*

Public spaces appeared early in Mesoamerica, often linked to emerging communal identity and/or sociopolitical complexity. Their construction, and subsequent maintenance and renovations, reflect the collective effort of different social actors and corporate entities. In Mesoamerica, public space first appears during the Early Formative period (1500–900 BCE), a time of emerging sociopolitical complexity at sites such as San Lorenzo, San Jose Mogote, and Paso de la Amada. The arrangement and orientations between platforms and plazas or open space lay the foundations for later innovations in public and ceremonial space throughout this cultural region. In addition to the construction of space, the placement of different deposits and offerings, both contemporaneous with the public space as well as later to its use, reveal important dimensions in understanding both the development of larger ritual and religious concerns as well as the emergence of local elites. Recent excavations at the site of Etlatongo, in the Mixteca Alta of Oaxaca, have confirmed the presence of public space during the later portion of the Early Formative. We both compare and contrast what has been documented about this public space with contemporaneous examples across Mesoamerica, recognizing variations in layout, style, contextual and construction history of these spaces.

[293] Chair

Saldana, Melanie (California State University Los Angeles)

[11] *"What's in that hole?" Engaging Subterranean Spaces in the Three Rivers Area of the Southern Maya Lowlands*

The importance of subterranean space has been well established through studies of Maya sacred landscape. The Maya word "che'en" is used for any natural feature that penetrates the earth such as caves, cenotes, rockshelters, chultuns, sinkholes, springs, and crevices, all spaces where the sacred nature of animate Earth are expressed. In the Three Rivers area of the southern Maya lowlands, non-cave Maya archaeologists appear to be at a loss on how to engage landscapes where sacred landmarks take more subtle forms. This presentation will bring to light the variety of subterranean space in the Three Rivers area, and their importance in understanding the surface archaeology around them.

[11] Chair

Saldana, Melanie [367] see Nicolas, Richard

Salgado, Silvia (Universidad de Costa Rica)

[326] *Discussant*

Salgado Ceballos, Carlos [183] see Flores Ramirez, Rosa Maria

Sallum, Marianne and Plácido Cali (Gestão Arqueológica)**[292]** *Colonialism and Tupi Persistence on the South Shore of São Paulo State, Brazil*

During the last few decades, many studies deconstructed the traditional colonial narratives about the Americas. They rethought the history with a less Eurocentric point of view, emphasizing the dynamic cultural values established among European, Indigenous peoples and Africans, contributing together to combine new and old social practices in colonial situations. This work aims an alternative narrative about Brazilian indigenous peoples, which uses a Tupi settlement located in Peruíbe on the South shore of the State of São Paulo, Brazil as a background. These are ruins of a Franciscan settlement (seventeenth century) and several older/more recent vestiges (fifteenth–nineteenth centuries). They indicate the historical persistence of Tupi people along centuries, which contrasts with the narrative centered on the extinction of this group. Thus, archaeological evidences play an important role on the reinterpretation of the colonial history and also identifies short-term events within the habitus concept. This work uses ceramics and other evidence for the construction of a more inclusive history of Tupi people. The results have indicated indicating the permanence of these peoples since precolonial times up to the nineteenth century, wherein they negotiated cultural practices as creative players in a constant process of self-determination in a long term history.

[292] *Chair*

Sallum, Marianne [215] see Lazcano Arce, Carlos

Salmen-Hartley, Jacob (UVic)**[47]** *Material Technology as an Indicator of Past Species Size*

Archaeological materials can provide data useful for modern conservation and resource management efforts. Zooarchaeological materials have been used to provide information about past species distributions as well as their characteristics. I am interested in using the material technology of prehistoric resource harvesting to provide information about species in the past. This poster will discuss my research using traditional halibut fishing technology to provide information about the fish being caught. Northwest Coast halibut hooks were crafted to target certain size fish. My research involves morphometric analysis of halibut hooks to determine the size of fish they were targeted to land. This data is needed because there is ambiguity in the archaeology of the region about the importance of halibut in past subsistence systems. Ethnographic material points to the importance of this species as a major food source for many different groups. However, archaeological research has not been able to provide evidence of this level of utilization. Furthermore, since the beginning of modern commercial fisheries, halibut size has been declining. Data about the characteristics of halibut prior to industrial fishing can be useful for species management efforts.

Salmi, Anna-Kaisa (University of Oulu)**[35]** *"Most beautiful favorite reindeer": Life Histories of Reindeer Offered at Sámi Offering Sites in Northern Fennoscandia*

Animal offerings made at various sacred sites were an integral part of the ethnic religion of the indigenous Sámi people of northern parts of present-day Norway, Sweden, Finland, and Russia from ca. AD 800 onward. The offering tradition was interwoven with subsistence patterns and human-animal relationships, as in the Sámi worldview, offerings were a means to communicate with gods and guardian spirits of animals to negotiate things such as success in hunting or reindeer husbandry. In this paper, I will focus on the life histories of the reindeer individuals selected for offering as they unfold by looking at age, sex, and size of the individuals, the stable isotope composition of their teeth and bones, and the offering site context where their bones were deposited. I will especially concentrate on two individuals offered at the Paddusas offering site in Northern Sweden in ca. AD 1170–1280 and AD 1445–1635, respectively. I will discuss how the lives of these reindeer were tangled with those of humans and other animals against a backdrop of changing social and economic environment, colonial contact between the Sámi and Scandinavian state powers, and reindeer domestication.

Salomon, Anne [49] see Salter, Natasha

Salter, Natasha (School of Resource and Environmental Management, Simon Fraser University), Amy Groesbeck (Clam Garden Network), Kirsten Rowell (University of Washington) and Anne Salomon (Simon Fraser University)**[49]** *Ancient Clam Gardens: Exploring Cultural and Ecological Mechanisms that Enhanced Clam Production*

Emerging evidence suggests that Northwest Coast First Nations sustained and enhanced shellfish production through features known as clam gardens, intertidal rock-walled terraces, built in the late Holocene. Experiments and surveys have revealed that clam gardens are 2–4 times more productive than non-modified clam beaches, supporting greater densities, biomass, and higher growth rates of important clam species. While heightened productivity within clam gardens is partly attributable to the reduction in beach slope and expansion of the area of optimal clam habitat, traditional knowledge suggests that additional tending practices were used to boost productivity. Practices involved the addition of shell hash to sediments, the aeration of these altered sediments, the reduction of inter and intra-specific competition through the harvest and removal of other filter feeders and the reduction of benthic predators. We simulated the addition of shell hash through a field experiment to determine the extent to which this tending practice further enhances clam productivity, hypothesizing that it improves growth and survival by locally buffering against unfavorable carbonate conditions. Ultimately, the results of this research will inform the degree to which this ancient form of mariculture can be used today to enhance food security and confer resilience to impending oceanic changes.

Salvatore, Mark [265] see Chenoweth, John

Salvatori, Sandro [219] see Jakob, Tina

Samec, Celeste (INGEIS-CONICET-UBA), Hugo Yacobaccio (IDA-CONICET-UBA) and Héctor Panarello (INGEIS-CONICET-UBA)**[238]** *Assessing Prehistoric Herding Strategies through Stable Isotope Analysis: A Case Study from the Dry Puna of Argentina*

The relationship between human groups and animal populations in the past can be studied through stable isotope analysis of zooarchaeological remains. More specifically, the isotopic analysis of domestic animals' tissues can help us to investigate herd composition, diet and mobility strategies employed by herders in the past. However, before these methods can be applied to resolve such questions, variation in isotopic composition and its causes must be addressed and explored by a modern reference dataset. For this purpose, we conducted a study of the variation in $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values measured on bone collagen from modern herds of domesticated South American camelids (*Lama glama*) of the Dry Puna of Argentina. At the same time, we compared those results with the $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values measured on bone collagen from domesticated South American camelids (*Lama glama*) recovered at different archaeological sites from the same area dated to the Late Holocene. Our results showed that the $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of

prehistoric herds displayed a similar pattern to those values measured on modern herds, indicating the complementary use of different altitudinal ranges by the herders that occupied the area during the Late Holocene as occurs in the present.

Samei, Siavash (University of Connecticut), Deborah Olszewski (University of Pennsylvania) and Natalie Munro (University of Connecticut)
[244] *Zooarchaeological Investigation of Late Pleistocene Subsistence Adaptations in Iran*

Economic decisions of Late Pleistocene foragers bore heavily on the nature, timing, and intensity of the adoption of agriculture in different parts of Eurasia. Decades of intensive research in the Levant and Anatolia have made significant contributions to our understanding of Late Pleistocene economic strategies in the western parts of the Near East. A recent surge of interest by Iranian researchers and internationally collaborative teams in Paleolithic archaeology of Iran has renewed attention on the more eastern parts of Near East. This has significant implications for Late Pleistocene research in other parts of the region, and warrants an in-depth examination of the current state of knowledge in Iran. Here, we synthesize the existing faunal record from Late Upper Paleolithic and Epipaleolithic deposits and sites from environmentally diverse habitats—Northern, Central, and Southern Zagros Mountains, Caspian littoral, and the Iranian Plateau. The faunal record is a sensitive indicator of the effect of climatic and ecological factors on subsistence adaptations. We combine our observations with other archaeological lines of evidence to provide a more holistic reconstruction of forager economic strategies during the pivotal time period between the Last Glacial Maximum and the beginning of the Neolithic period.

Sampeck, Kathryn (Illinois State University)

[159] *Time, Place, and Community: Visualizing the Living Cherokee Landscape*

First Landscapes is a digital conservation project with two major goals: to protect and preserve First Nation/Native American heritage in culturally situated manner, and to make information accessible and usable in ways determined by stakeholders. This project organizes and presents results of several seasons of archaeological fieldwork as well as historical documents, maps, ethnographic records, and imagery by and about Cherokee people curated in several institutions across the United States. Recent and ongoing archaeological work at the historic Cherokee Towns of Cowee (31MA4) and Nvnvnyi (31SW3) included discovery of abundant evidence of architectural remains through remote sensing (ground-penetrating radar, magnetometry, resistivity) and excavations. 3D models present each kind of imagery as a flyover and fly-through experience. The First Landscapes web interface and mobile app give the ability to traverse the Cherokee landscape replete with Cherokee names, stories, images, and information through exhibits organized by territorial divisions that are historically documented and that Cherokees implement today. Within these exhibits are areas and locations that range from well preserved or well-known to nearly destroyed. QGIS, mbira, and other open-source programs offer opportunities for new ways of visualizing spatial data that benefit both archaeological professionals and the public.

[64] *Moderator*

[128] *Discussant*

Sampeck, Kathryn [39] see Bishop, Ronald L.

Samson, Alice (School of Archaeology and Ancient History, University of Leicester)

[133] *Examining the Religious Dynamics of the Columbian Exchange: Islands of Belief and Conversion*

The major moments of cultural exchange in global accounts of encounter have happened across the oceans and therefore island communities have often been first to experience contact and shape the nature of this encounter. This is certainly the case in the Caribbean where the island Taino were the first to encounter Europeans in the New World. The archaeology of Mona Island provides insights into both the origins of indigenous Taino identities and religious communities, and the processes of religious creolization in colonial worlds. Recent research has revealed a well preserved indigenous subterranean landscape on Mona Island in the Caribbean. Archaeological and speleological survey in over 60 of the islands 200+ caves, and an exploratory dating program of cave floor deposits, artifacts, and pigments, delineate a distinct horizon of late precolonial and early colonial cave use spanning approximately 170 years, and continuing into the sixteenth century after the Spanish invasion. This paper will explore the role of subterranean archipelagic interactions and ensuing processes of co-conversion and which shaped religious life in the Americas.

[93] *Moderator*

[289] *Discussant*

Samuelson, John [87] see Hammerstedt, Scott

San Román, Manuel J. (Universidad de Magallanes), Víctor Sierpe (University of Tarapacá, Doctoral Program—Univers), Jimena Torres (Universidad de Magallanes, Instituto de la Patagon), Cristóbal Palacios (Universidad de Magallanes, Instituto de la Patagon) and Marianne Christensen (Université de Paris I Panthéon-Sorbonne, UMR 7041)

[233] *New Information on Marine Hunter-Gatherers of the Southernmost End of South America: Technological and Zooarchaeological Study of Site Bahía Mejillones 45, Chile*

In this poster we present the results of research at Bahía Mejillones 45, located at the northern coast of Navarino island, at 55° parallel south, Chile. We describe and illustrate the results of an extended archaeological excavation, including stratigraphic and radiocarbon information (6850 cal BP) concerning the Middle Holocene assemblage. Bone technological elements are characteristic of early marine hunter-gatherer groups of the region, considering multi-denticulate harpoons, detachable harpoon points with one barb and cruciform base, chisels made on pinniped ulna, cruciform base stemmed wedges on whale bone and ornament artifacts. The archaeological deposit has a short formation timeline of less than 100 radiocarbon years, providing the assemblage with a high-resolution chronological frame and excellent context integration for specialized fauna and artifact analysis.

San Román, Manuel J. [226] see Borrero, Luis

San Román, Manuel J. [231] see Morello Repetto, Flavia

San Román, Manuel J. [32] see Reyes, Omar

Sanchez, Adriana (Mensabak Project)

[201] *Akna and the Moon Spinners: Gender Relations and Rituals in Caves*

Mensabak Lake, in the Lacandon Rainforest, is surrounded by caves that were used as pilgrimage destinations and for different rituals in the Protohistoric period. The role of Maya women in the rituals and ceremonies has been delimited to fertility and dependency stereotypes not only in the historical documents but in the archaeological research. This presentation discusses Maya women's participation in a multiregional pilgrimage network having Mensabak as the epicenter.

Sanchez, Francisco (Francisco J. Sanchez Tornero)

[145] *Tizatl y tizatlalli: El uso de diatomea fósil en el engobe blanco de la cerámica Coyotlatelco en Santa Cruz Atizapán*

La utilización de restos de diatomea fósil referida en las fuentes históricas como tizatl o tizatlalli, sin duda, fue una práctica cultural de larga historia en las poblaciones del valle de Toluca. Existe evidencia que nos sugiere la continuidad de una larga tradición cromática desde, por lo menos, hace aproximadamente 3500 años. Esta ponencia se centra fundamentalmente en torno al uso de engobe blanco en los materiales cerámicos Coyotlatelco, procedentes de varios sitios localizados en el valle de Toluca, y en especial el sitio arqueológico de Santa Cruz Atizapán. Mediante la aplicación de microscopía electrónica de barrido (SEM) y espectrometría por dispersión de energías de rayos X (EDX), se han analizado los engobes blancos de fragmentos cerámicos, cuya cronología corresponde al Epiclásico (650 dC-900 dC), concretamente al tipo cerámico rojo sobre blanco. Los resultados de dichos análisis permiten aproximarnos a la larga tradición del uso de colorantes blancos procedentes de roca sedimentaria silíceas de origen orgánico. En el caso de los materiales analizados, provenientes del valle de Toluca, se reconoce que la aplicación de diatomita, ampliamente disponible en la región lacustre como pigmento, tiene una tradición muy arraigada desde, por lo menos, el periodo Formativo.

Sanchez, Gabriel (Department of Anthropology, University of California Berkeley)

[378] *Cetacean Hunting on the Northern Oregon Coast: Evidence from the Par-Tee Site (35CLT20)*

Indigenous whale hunting on the Pacific Northwest Coast is predominately associated with whaling cultures north of Oregon in northern Washington and British Columbia's Vancouver Island. Ethnographic and ethno-historical records from the northern Oregon Coast suggests whaling occurred locally, at least opportunistically. To date the only physical evidence of local whaling is a humpback whale (*Megaptera novaeangliae*) phalanx with an embedded elk (*Cervus elaphus*) bone harpoon point. A calibrated date for the embedded harpoon places the whale-hunting event between ~ cal AD 430 and 550. These dates suggest that whale hunting took place on the Oregon Coast more than a millennium before historic contact. This paper synthesizes recent research on Oregon Coast whaling including ethnographic and ethno-historical data, artifact analysis, and blood residue analysis to investigate whale hunting during prehistoric times along the northern Oregon Coast.

Sanchez, Guadalupe [84] see Carpenter, John

Sanchez Miranda, Guadalupe (Instituto de Geología-UNAM/INAH)

[368] *Between Seri, Cahita, and Tepima: Paleoethnobotanical Research on the Central Coast of Sonora, Mexico*

The sixteenth century Spaniards that arrived at the Central Coast of Sonora described the region between the Río Sonora and the Río Yaqui, as a transitional territory between the Comcáac (Seri) nomadic bands of the coast, and the farmers of the river Yaqui (Yoeme) and Pima. Unfortunately, the archaeology of this region is very little known and very little is known about the prehistoric history of the area. Recent investigations at several sites in this area, have yielded a variety of macrobotanical remains obtained from roasting pits and ashy sediments, as well as, dehydrated plant parts collected during our excavations at the Tetabejo Cave. Here we present some preliminary result of the plant use as food and implements at several sites. Agave fibers and spines were used as needles and ropes; mesquite seeds, cacti (e.g., saguaro, barrel cactus, and pitahaya) and weeds are very well represented and appear to be an important food stuff, corn and beans are also present and probably represent a commodity that was exchange between the farmer and the Seri bands of the coast.

[150] *Discussant*

Sánchez-Morales, Ismael (School of Anthropology—University of Arizona)

[140] *The Clovis Lithic Technology at El Fin del Mundo: Early Paleoindian Mobility and Land Use Patterns in North-Central Sonora, Mexico*

Clovis populations are thought to have been wide ranging, highly mobile foragers, as reflected in stone tool raw material procurement patterns and technological features of associated lithic assemblages. Intense utilization of high quality nonlocal cryptocrystalline raw materials, heavy stone tool refurbishing and repair strategies, and a lithic industry based on bifacial reduction are main features of the Clovis lithic technological organization suggestive of high mobility. In north-central Sonora, Mexico, non-cryptocrystalline stone raw materials dominate the Clovis point assemblage, and extensive sources of igneous rocks were intensively exploited by Clovis flintknappers, which has been interpreted as evidence of less mobile, place oriented groups. At El Fin del Mundo, a multicomponent Clovis site located in north-central Sonora, local sources of rhyolite were largely exploited, and more than half of the Clovis stone tools were made on locally available raw materials. However, the analysis of the overall lithic technological organization at the site indicates that the stone tool assemblage is consistent with the idea of Clovis groups as wide ranging and highly mobile. Furthermore, the Clovis component from El Fin del Mundo is comparable to those from the San Pedro River Valley, which have been interpreted as resulting from highly mobile strategies.

Sanchez-Morales, Lara (Department of Anthropology, University of Texas–Austin)

[69] *The Impacts of Cattle Introduction in Puerto Rican Landscapes during the Colonial Period*

In this presentation I examine the environmental impacts that cattle introduction had in Puerto Rico by combining geoarchaeological and ethnohistorical methods. During the sixteenth century hides became one of the most profitable commodities to be produced in the Caribbean. For the bigger islands of the Antilles, it has been reported that these early populations proliferated, leading to underground economies based upon their exploitation. Through the analysis of historical accounts and the provisional analysis of sedimentation rates associated to grazing in various sites in the island from the sixteenth century onward, I will explore how the presence of cattle played a role in transforming Puerto Rican environments. This study is part of a broader effort to elucidate the long history of human occupation and its impacts on the landscapes of Puerto Rico.

Sánchez Nava, Pedro Francisco [328] see Piña Calva, Maribel

Sanchis, Alfred [169] see Real Margalef, Cristina

Sandberg, Paul [82] see Joyce, Arthur

Sanderford, Robert [169] see Egeland, Charles P.

Sanders, Mariana (University of Colorado, Boulder), Gerardo Gutiérrez (University of Colorado, Boulder) and James Córdova (University of Colorado, Boulder)

[306] *Examination of Mural Pigments with Portable XRF in the Caves of Eastern Guerrero with Comparisons to Local Colonial Lienzos and Documents*

Rock art is now recognized as a key component of cultural expression in prehistory and a variety of new techniques have been developed to offer more insight into this area of archaeological expression. Here, we present our findings from the use of portable X-ray fluorescence (pXRF) analysis at cave sites in the state of Guerrero, Mexico. The authors offer a scientific basis for deriving inference regarding the process of rock art creation in several caves located in eastern Guerrero through the analysis of their pigments.

Sandgathe, Dennis [90] see Hvidberg, Madisen

Sands, Rob [376] see Megarry, Will

Sandvik, Paula Utigard [224] see Martens, Vibeke Vandrup

Sandweiss, Daniel H. (University of Maine)

[143] *Early Fishing on the Atacama Desert Coast of Southern Peru*

The coastal Atacama Desert in southern Peru has some of the oldest and best documented fishing sites in western South America, including Terminal Pleistocene through Early Holocene components at Quebrada Jaguay and Quebrada Tacahuay and Early to Middle Holocene components at the Ring Site and Quebrada de los Burros. These sites have offered insight into the antiquity and variability of the early fishing tradition, the antiquity and features of coast-highland interaction, and coastal settlement patterns. Focusing in particular on data from Quebrada Jaguay and the Ring Site, I summarize current understanding of early maritime adaptations in the northern Atacama Desert. I conclude by identifying unresolved questions and potential approaches to solving them, such as: use of terrestrial resources by fishing groups in light of differential preservation of floral and faunal remains; did objects move between coast and highlands via trade or group mobility; and what is missing from the archaeological record—especially in the water and resource rich coastal valleys where no early sites have been recovered—and what that may mean for understanding early population dynamics.

[6] *Discussant*

Sandweiss, Daniel H. [359] see St. Amand, Ani

Sanger, Matthew (Binghamton University)

[334] *Socializing Novel Landscapes: Reconsidering "Colonization" through Indigenous Philosophies*

Archaeologists have long been interested in studying how landmasses became "colonized." Using biological analogies, archaeologists often describe colonization as a process by which ecological niches become filled by human populations that evolve to best fit into their new environs. This paper suggests an alternative informed by Indigenous philosophies that describe a world filled with animate and powerful beings emplaced throughout the landscape. Forging relations with these beings is a critical goal for many Native American communities and are typically formed through points of revelation at which communication across worlds is made possible. Informed by these worldviews, the occupation of a novel landscape would require the creation of social networks between newly arrived humans and the powers living there. To explore the applicability of Indigenous frameworks to archaeological research, this paper looks at how the American Southeastern coastline was occupied shortly after its formation during the Late Archaic period. This occupation is quite distinctive in that it largely consists of highly structured deposits of shell arranged in circles or open arcs that surround broad plazas. I posit that these constructions are means by which communication between human and nonhuman worlds were formed.

Sanger, Matthew [4] see Hill, Mark

Sankaranarayanan, Krithivasan [86] see Mann, Allison E.

Sanmark, Alexandra (University of the Highlands and Islands)

[324] *Assembly Sites: Arenas of Interplay between the Elite and Wider Community in Late Iron Age Scandinavia*

This paper investigates the interrelationship between the elite and the wider community at Scandinavian assembly (thing) sites in the late Iron Age. Monuments suggest that these sites were designed by the elite for the performance of elite rituals, such as legitimizing power and kingship. At the assembly, laws involving ethnic identity and group belonging were publicized and enforced and the sites themselves must therefore have had a role to play in the creation and upholding of collective identities. Community activities and rituals, which most likely and created collective memories and strengthened social cohesion, were enacted. Many of these activities may have been designed by the elite, but equally the idea of assemblies as communal spaces may have been collectively driven. Assemblies therefore formed arenas of interplay between the top-elite and the wider population; kings were elected and ruled through the assembly, while at the same time continuously dependent on the endorsement of the people. This enduring concern for thing sites and associations is also richly evident, attesting to the potent role of meeting-places as curators of local identity over the longue durée.

Sanroman, Adriana (Proyecto Templo Mayor, INAH), Maria Barajas Rocha (Proyecto Templo Mayor, INAH), Valeria Hernandez (Proyecto Templo Mayor, INAH) and Erika Lucero Robles Cortés (Proyecto Templo Mayor, INAH)

[225] *Conservation of Sawfish Rostra in the Great Temple of Tenochtitlan*

Throughout the explorations of the Templo Mayor Project, numerous offerings have been surveyed, most of them standing out for the large number of animal remains recovered including a great deal of sawfish, characterized by an anterior long and flat snout that has teeth on both sides. Their skeleton and snouts are chemically composed by hydroxyapatite and collagen in different crystalline arrangements. This causes the stabilization and conservation processes to be a challenge for the archaeological conservators. After almost five hundred years of burial, the object's chemical structure

and mechanical properties have been severely altered and the material has become highly fragile. Given the valuable information these findings shed to light, their preservation is necessary. For almost forty years, the conservators at Templo Mayor have applied different restoration treatments in order to preserve these rostra. Nowadays, the interdisciplinary work between conservators, archaeologists and biologists has resulted in a better understanding of the role of this fish in prehispanic world, as well as of their alteration and deterioration processes and the evaluation of the methods and materials used for their preservation. In this paper we discuss the different methods used to preserve these materials as well as their benefits and disadvantages.

Santa Rosa del Río, Miguel [142] see Fonseca Ibarra, Enah Montserrat

Santacruz, Ramón [353] see Romero, Ashuni

Santana Sagredo, Francisca (Research Laboratory for Archaeology and the History of Art, University of Oxford)

[134] *An Isotopic Evaluation of the Classic Andean Mobility Models in Northern Chile during the Late Intermediate Period (AD 900–1450)*

Research on the Late Intermediate Period (AD 900–1450) in northern Chile has been strongly influenced by two mobility models: John Murra's classic vertical archipelago model and the more recent gyratory mobility model. The use and application of these two models, however, is problematic since there is insufficient supporting archaeological evidence. The use of stable isotope analysis allows a direct approach for studying diet and mobility patterns, in contrast to material culture. The aim of this work is to evaluate the presence of colonies and specialized highland pastoralist groups in the lowlands of northern Chile through the application of $\delta^{13}\text{C}$, $\delta^{15}\text{N}$, $\delta^{18}\text{O}$ and $87\text{Sr}/86\text{Sr}$ to various human tissues, including tooth enamel, bone collagen, bone apatite, and hair-keratin. The results show strong local traditions in terms of diet and mobility associated with the Pica Tarapacá and Atacama cultures. However, a small number of isotopic outliers suggest a nonlocal origin for some individuals in both groups. Based on the isotopic evidence, it is suggested that there is no evidence to support either the 'colony' or the gyratory mobility model. Mobility patterns were, instead, diverse and flexible including female and male individuals that moved at different moments during their lives (infancy and adulthood).

[134] *Chair*

Santarelli, Brunella [105] see Bisulca, Christina

Santasilia, Catharina (PhD student, University of California, Riverside)

[236] *Exploring Ceramic Variability at Tlatilco, Mexico*

Tlatilco is an Early Formative society located in the Basin of Mexico dating from c. 1250–600 BCE. The site which was discovered by Mexican archaeologist, Miguel Covarrubias in the 1930s has undergone several phases of archaeological seasons often with very little material published. Many of the cultural objects uncovered were dispersed into museum collections in North America, used primarily as illustrative material. My research involves gathering iconographic and archaeological data from major collections all over the United States, as a supplement to understand the variation within the material expression of this ancient culture. Through comparative techniques, as well as utilizing advanced laboratory analysis, I am investigating the diversity of the community of Tlatilco and its neighbors. The analysis of the many objects is contributing to a better understanding of the identity, ideology, and the political roles concerning Tlatilco's efforts to participate as one of the Early Formative communities within Mesoamerica.

Santoro, Calogero M. (Universidad Tarapacá, Centro Investigaciones del H. Desierto, Arica, Chile), José M. Capriles (Department of Anthropology, The Pennsylvania State), Claudio Latorre (Departamento de Ecología y Laboratorio Internacion), Eugenia M. Gayo (Centro de Ciencia del Clima y la Resiliencia (CR)2) and Ricardo De Pol Holz (Gaia-Antartica, Universidad de Magallanes, Punta A)

[143] *Unearthing the Deep Roots of the Long-Term Human History and Environmental Interaction in the Atacama Desert*

New archaeological evidence demonstrates that by 12,800 years ago, bands of hunter-gatherers effectively occupied the hyperarid basins of the Atacama Desert. The selection of the habitats they exploited and the location of their activity areas were constrained by specific environmental circumstances that coincide with positive moisture anomalies that provided abundant resources. The distributions and properties of which were likely managed by these people to create complex landscapes using specialized adaptive strategies. It is still uncertain, however, whether these people were the first to occupy the desert or if they were preceded by a wave of even earlier colonizers engaged in exploratory tactics. Considering that by at least 14,500 years ago, humans inhabited the southern tip of South America (i.e., Monte Verde), and that favorable environmental conditions existed in the Atacama Desert between 17,000 and 14,000 years ago, we discuss the idea that human occupations in the Atacama Desert were likely preceded by an even earlier phase of exploration. This means the first migratory South American groups traversed and eventually colonized the Atacama Desert perhaps as early as 15,000 years ago under environmental conditions that would have been extremely favorable to human dispersion.

Santoro, Calogero M. [88] see Capriles, José M.

Santos, Ana Luisa [235] see Gooderham, Ellie

Sapir-Hen, Lidar [340] see Munro, Natalie

Saravia, Juan Fransisco [218] see Andrieu, Chloé

Sarcina, Alberto (ICANH—Instituto Colombiano de Antropología e Historia)

[395] *Santa María de la Antigua del Darién: The Aftermath of Colonial Settlement*

What kind of relationships were created between the indigenous people of the western region of the Gulf of Urabá (Colombia) and the Spaniards in the early years of the conquista? What happened in Santa María de la Antigua del Darién (1510–1524), the first European city founded on the American mainland, in the course of its short history, and immediately after its abandonment? We have a number of clues that can be drawn from contemporary historical sources (Oviedo), sources immediately following the demise of Santa María (the reports of the travels of Julian Gutiérrez) and archaeological investigations now in progress in the area of the city. This paper will offer new reflections on these questions, on the basis of archaeological data obtained during the 2014–2016 excavations directed by the author. These findings include ritual burials dated to the phase of the city's abandonment; "contact" pottery from the Basurero Norte area; and, the "F Excavation," a possible house inhabited by indigenous servants (naborias).

Sarig, Rachel (Dan David Center for Human Evolution, Tel Aviv University), Ofer Marder (Archaeology Division, Ben-Gurion University of the), Omry Barzilai (Israel Antiquities Authority, Jerusalem, Israel), Bruce Latimer (Departments of Anatomy and Orthodontics, Case West) and Israel Hershkovitz (Dan David Center for Human Evolution and Biohi)

[338] *The Upper Paleolithic Inhabitants of Manot Cave: The Dental Perspective*

The study on the partial calvarium discovered at Manot Cave, Western Galilee, Israel (dated to 54.7 ± 5.5 kyr BP, Hershkovitz et al. 2015), revealed close morphological affinity with recent African skulls as well as with early Upper Paleolithic European skulls, but less so with earlier anatomically modern humans from the Levant (e.g., Skhul). The ongoing fieldwork at the Manot Cave has resulted in the discovery of several new hominin teeth. These include a lower incisor (I1), a right lower first deciduous molar (dm1), a left upper first deciduous molar (dm1) and an upper second molar (M2) all from area C (>32 kyr) and a right upper second molar (M2) from area E (>36 kyr). The current study presents metric and morphological data on the new Manot Cave teeth. These new data combined with our already existing knowledge on the Manot skull may provide an important insight on the Upper Paleolithic population of the Levant, its origin and dietary habits.

Sarig, Rachel [338] see Hershkovitz, Israel

Sarjeant, Carmen

[271] *Comparative Techniques to Uncover Networks of Ceramic Technology in Southern Vietnam*

The analysis of ceramics in Southeast Asia has evolved from typologies and broad comparative discussions of vessel forms and surface treatments. Like other material culture, studies on ceramics from mainland Southeast Asian prehistoric sites that employ archaeometric techniques have escalated in recent years. The appearance of fine, incised and impressed ceramics in southern Vietnam dating to the Neolithic period (4500–3000 BP) is closely associated with sedentary settlements, cereal agriculture, and domesticated pigs and dogs. In southern Vietnam, new data about Neolithic settlements were obtained during the excavations at An Son and Rach Nui in 2009 and 2012. This paper presents systematic comparative methods, including a correspondence statistical analysis, for analyzing ceramic vessels from Neolithic sites in southern Vietnam to identify potential paths of communication for ceramic technology in the past, particularly along river courses. This is an ongoing project, and as sites are excavated or re-excavated, ceramic data can be included in the comparative study. As a result, modeling ceramic technology in southern Vietnam and beyond to other areas of mainland Southeast Asia can reveal migration pathways and interactions between different groups.

Sarris, Apostolos, Tuna Kalayci (GeoSat ReSeArch Lab, Foundation for Research and T) and Francois-Xavier Simon (GeoSat ReSeArch Lab, Foundation for Research and T)

[282] *Neolithic Enclosures in Neolithic Greece: A Geospatial Approach*

The Neolithic in Europe is widely considered a key epoch. For the first time, societies got occupied with husbandry and settled for the cultivation of food crops for sustenance. Thessaly (Central Greece) is of critical importance in this transformation serving as the gateway to what would become the widespread Neolithization of Europe which irreversibly altered the course of human history. In this archaeological setting, enclosures were essential parts of many settlements. Were they built as defensive features due to conflict and emergence of a social hierarchy? Or were they used as an animal refuse area, as a burial place, or even as a cistern for water storage? Maybe they were more symbolic than functional. Despite their significance these features remain elusive for archaeologists. The IGEAN (Innovative Geophysical Approaches for the Study of Early Agricultural Villages of Neolithic Thessaly) project revealed astonishing new information on Neolithic enclosures. Through an amalgamation of different geophysical approaches it was possible to indicate that the enclosures were significantly diverse in shape and size, but also probably in meaning and function. Geospatial modeling further suggest a connection between flood-farming and enclosing.

Sarris, Apostolos [29] see Parkinson, William

Sasaki, Yuka (Paleo Labo Co., Ltd.)

[211] *Feasting from the Early to Middle Jomon Period Deduced from Seed Impressions on Pottery*

Seed impressions of cultigens have been recovered from pottery of the early to middle Jomon periods in the central highland of Honshu and the western Kanto district of Japan. These include such cultigens as *Perilla frutescens* introduced from China and Azuki bean (*Vigna angularis*) and Soy bean (*Glycine max*) domesticated in Japan. They often occur in large numbers and are also found even in clay figurines (Dogu). I found that the seeds exist not only on pottery surfaces, but also within pottery clay from X-ray CT observation. Image analyses of pottery revealed that even those impressions on pottery surfaces were not applied on the surfaces after shaping, but included in the clay while mixing. Seeds included in large numbers derive only from the above three cultigens, Cornus, and *Zanthoxylum* that people used commonly. However, inclusion of these seeds occur irrespective of pottery types. Thus, inclusion of the seeds of these five plants in the pottery was intentional, and these seeds had a special or ritual importance in the people's lives such as wishes or acknowledgements for rich crop. Restricted occurrence of pottery with many seed impressions in large settlement sites seems to reflect hope for continuous use of plant resources.

Sassaman, Kenneth (Univ of FL—Anthropology)

[311] *Discussant*

Sato, Takao (Keio University, Department of Archaeology and Ethnology), Andrzej Weber (Department of Anthropology, the University of Albe), Taichi Hattori (Graduate School of Letters, Keio University), Tomonari Takahashi (Graduate School of Letters, Keio University) and Hirofumi Kato (Center for Ainu and Indigenous studies, Hokkaido U)

[396] *Animal Utilization and Animal Rituals of the Okhotsk Culture: with Special Reference to Their Period and Regional Differences*

In the animal utilization and animal rituals of the Okhotsk culture, chronological and regional differences can be observed. Significant differences can be seen between the northern and eastern regions of Hokkaido in terms of the volume of archaeological artifacts recovered relating to both domestic animals (dogs, pigs) and wild animals. In northern Hokkaido, there are conspicuous differences in the use of a variety of fishes and types of sea urchins between the early period (Towada) and the middle period (Kokumon). In addition, in eastern Hokkaido, there appears to have been a rapid increase in the incidence of beliefs and rituals relating to deer during the late Okhotsk culture (Tenpumon Period). In this paper, we review this variation based on the findings of recent excavations, and we discuss the social and economic changes affecting the people of the Okhotsk culture in response to changes in climate and shoreline conditions, as well as the success or failures of neighboring peoples.

Sato, Takao [332] see Kato, Hirofumi

Sattler, Robert, Thomas Gillispie (Tanana Chiefs Conference), Carrin Halfmann (University of Alaska Fairbanks) and Angela Younie (Tanana Chiefs Conference)

[252] *Tochak-McGrath Discovery: Three Precontact Individuals from the Upper Kuskokwim River, Alaska*

Three precontact individuals inadvertently discovered in the village McGrath, Alaska provide a novel understanding of human history of the Upper Kuskokwim River region of Eastern Beringia. Collaboration between the McGrath Village Council, MTNT, Inc. and Tanana Chiefs Conference enabled a community research endeavor that has yielded a radiocarbon age estimate of c. 600–700 cal BP, isotopic dietary reconstruction suggesting a strong reliance on anadromous salmon, rare dental traits including a two-rooted lower canine and a fourth molar, and a population relationship similar to modern Alaska Natives through mtDNA (A2a and A2 root) and yDNA (Q). The three individuals are intergenerational (c. 30, 20, 2–3 years of age) and shared a similar high marine diet. Additional faunal remains at the multicomponent site include dog (*C. lupus familiaris*), bear (*Ursus* sp.), beaver (*Castor* sp.) and burbot (*Coregonus* sp.). Situated in the alluvial floodplain of the Kuskokwim River, the context suggests the Tochak family drowned together and were buried rapidly by natural sedimentation processes. The results of interdisciplinary research on the Tochak McGrath site provide rare insights into the precontact lifeways of Alaska Natives in the upper reach of the Kuskokwim River basin.

Saturno, William, Robert Griffin (University of Alabama Huntsville), Thomas Sever (University of Alabama Huntsville) and Boris Beltran (Proyecto Regional Arqueológico San Bartolo-Xultun)

[131] *Site Map Validation and Quantifying Linkages between Multispectral and Lidar Remote Sensing for Settlement Pattern Mapping*

Fifteen years of field survey and image processing of commercial satellite optical data have contributed to robust site maps of San Bartolo and Xultun, among other PROSABA sites in northeastern Petén. The recent acquisition of lidar-derived DSM and DTM data through PACUNAM has made new types of analyses possible, including the validation and enhancement of the site maps. We present recent mapping discoveries in the PROSABA region and research into the validation and extrapolation of settlement pattern signatures through vegetation canopy responses in northern Guatemala.

Saturno, William [321] see Hotaling, Jessica

Saucedo, Alfredo

[3] *Entre dos épocas: Laguna de los Cerros y la transición del Preclásico Temprano al Preclásico Medio*

Laguna de los Cerros enclavado dentro de la región Olmeca, ha figurado al lado de tres grandes centros: San Lorenzo, La Venta y Tres Zapotes, aunque su posición en la jerarquía regional durante el Preclásico nunca se equiparó a ninguno de ellos. San Lorenzo y La Venta se han considerado como las grandes capitales del sur de la costa del Golfo, representativas del Preclásico temprano y medio respectivamente. En este sentido, Laguna de los Cerros tuvo una ocupación continua e importante durante estos periodos de tiempo, resistiendo los cambios en las dinámicas regionales. Nuestras observaciones oscilan sobre la transición entre estos dos periodos y el cambio en la rectoría regional a través del papel desempeñado por Laguna de los Cerros, nuestro argumento se apoya en el análisis sobre los monumentos registrados en este asentamiento, ya que presentan particularidades estilísticas e iconográficas. Además, en el presente escrito, discutiremos los trabajos previos de corte regional realizados en esta zona, estos testifican la continuación del asentamiento incluso hasta un periodo muy posterior, el Clásico tardío. ¿Laguna de los Cerros puede representar la clave en el entendimiento de las manifestaciones culturales que tuvieron lugar en el relevo de San Lorenzo por La Venta?

Saunaluoma, Sanna-Kaisa (USP)

[327] *Late Precolonial Circular Villages in the Brazilian State of Acre*

The archaeology of Acre has been widely drawing the attention of the scientific community due to the discovery of an ancient civilization building geometric earthworks labeled “geoglyphs.” In the course of field surveys realized at the geoglyph sites other types of archaeological sites were documented as well, including sites consisting of small artificial earthen mounds arranged in a circular form. At first, the mound sites were also classified as geoglyphs, but through the recent fieldwork it became clear that they represented a distinct type of archaeological site, with features, contents, and functions differing noticeably from the geoglyphs. Initial surveys conducted at sites featuring circles of approximately 1.5 m high mounds around a central open space with a diameter of roughly 100 m, indicated a feasible residential use of the mounds for the late precolonial period. Ethnographic circular villages are known in central Brazil and in southern Amazonia, and are associated with the Gê and Arawak ethno-linguistic groups. In these regions, as well as in central Amazonia, archaeological sites comprising vestiges of circular plaza settlements have been recorded, but until now they were not acknowledged in southwestern Amazonia.

Savage, Dan [214] see Demarte, Pete

Savelle, James M. (McGill University)

[35] *Prehistoric Thule Whaling Societies in the Canadian Arctic: Ritual, Symbolism, and Ideology*

Prehistoric Thule Inuit in the Canadian Arctic were preeminent whalers, focusing on the bowhead whale, the largest prey species hunted by any prehistoric or historic hunter-gatherer society. The ethnographic literature provides a rich source of information dealing not only with the importance of bowheads in the diet of early historic bowhead-hunting Inuit societies, but also how social structure, ritual, symbolism and ideology were all centered on complex Thule-bowhead relationships. This rich data source has for the most part been virtually ignored by Canadian Arctic archaeologists, who often cite the ‘active hunting vs. stranding’ problem and/or the related problem of dealing with bowhead remains (bones) as primarily architectural as opposed to diet-related (as will be discussed, these are both non-issues). In this paper, the distribution of archaeological bowhead whale remains associated with dwellings, ceremonial features, burials, flensing beaches, etc., when considered through the lens of not just only diet, but also ritual, symbolism and ideology, offers a much richer understanding and appreciation of Thule-bowhead relationships.

Savelle, James M. [190] see Kotar, Kathryn

Sawchuk, Elizabeth (University of Toronto)

[203] *The Origins of Pastoralism in Eastern Africa: New Human Dental Evidence from Mid-Holocene Pillar Sites in the Turkana Basin*

Herding spread into Eastern Africa ~5000 BP, but mechanisms of spread are still debated (migration, diffusion, or a mix). If herders migrated from desiccating areas of the Sahara, Sahel, or Ethiopian Rift, they would have passed through the Turkana Basin, where the earliest livestock coincides chronologically with the construction of megalithic “pillar sites.” Recent excavations at three pillar sites revealed extensive human burials, plus caprine remains and zoomorphic artifacts suggesting these people were pastoralists. Their dental remains can therefore shed light on the biological affinity of

Eastern Africa's earliest herders and the likelihood of different mechanisms of spread. To test the migration hypothesis, 37 nonmetric permanent tooth dental traits from this new sample ($n = 25$ dentitions) were compared with Holocene LSA ($n = 40$), early herder ($n = 53$), and Pastoral Neolithic (PN) ($n = 91$) skeletons from Kenya and Tanzania. Mean measure of divergence analyses reveal no significant phenetic differences between any of the sample groups, although greater distance is observed between the pillar sites and LSA. Therefore, if early herding involved in-migration, there was substantial gene flow between indigenous foragers and incoming herders. Continuity between the pillar sites and PN suggest these interactions strongly influenced subsequent development of herding-intensive cultures in the south-central Rift Valley.

[203] Chair

Sawyer, Elizabeth (Monticello Department of Archaeology) and Katelyn Coughlan (Monticello Department of Archaeology)

[259] *Evaluating the Effects of Time Averaged Deposits on Archaeological Chronologies*

Establishing intra- and intersite chronologies for the dwellings and workshops at Monticello's Mulberry Row has been a focus of study for decades. While broad temporal outlines are clear, we argue here that further progress depends on gaining better analytical control of a key issue: time averaging of archaeological assemblages. In this poster, we present our iterative process to develop methods to estimate variation in time averaging between these assemblages at different levels of aggregation. We highlight how the results can advance our understanding of Mulberry Row's complex formation processes by accounting for postdepositional disturbances and different archaeological practices. Ultimately, controlling for variation in time averaging is key to obtaining more accurate estimates of synchronic variation and change over time in assemblage content among different sites. Future intersite analysis will use this as a foundation to explore a plethora of research topics, including evaluating artifact assemblages from concurrent structures and comparing Mulberry Row sites to contemporaneous field quarter sites.

Sayle, Kerry (Scottish Universities Environmental Research Centre), Anthony Krus (Scottish Universities Environmental Research Centre), Anne Jensen (Ukpeagvik Iñupiat Corporation, Science LLC) and Derek Hamilton (Scottish Universities Environmental Research Centre)

[144] *Rethinking Chronology in Barrow, Alaska: Assessing ΔR Variation and Applying Bayesian Chronological Models*

Over 200 radiocarbon dates from archaeological contexts are available from the Point Barrow vicinity, along northern Alaska's Arctic coast, which has been occupied by hunter-foragers from the Birnirk period (AD 500–900) to the present day. Stable isotope analysis ($\delta^{13}C$ and $\delta^{15}N$) of ancient humans from the Point Barrow vicinity indicates their diets were very rich in marine protein, and therefore interpretation of these radiocarbon dates has been hindered by radiocarbon offsets. Radiocarbon ages from marine-derived carbon will be anomalously old if not corrected for the Marine Reservoir Effect (MRE), the radiocarbon age offset between contemporaneous marine and terrestrial carbon. Modern MRE values from the Alaskan Arctic are highly varied, from several hundred to over a thousand years, due to the extended residence time of ^{14}C in oceanic environments. It is questionable how reflective modern values are of those from the past because changes in upwelling, climate, and ocean currents will inevitably result in changes in local MRE values through time. Here we present new temporally specific ΔR estimates, which is the local deviation from the global surface water MRE, and apply these in a Bayesian chronological model to better estimate the timing of ancient activity.

Sayre, Matthew (University of South Dakota)

[269] Discussant

Scaffidi, Beth K., Natasha P. Vang (Vanderbilt University) and Tiffany A. Tung (Vanderbilt University)

[290] *Diet in Coastal Arequipa, Peru, at the Dawn of the Wari Empire*

Excavations at Uraca, a cemetery in the Majes Valley, Arequipa, Peru, uncovered incomplete human skeletons (MNI = 157) and associated grave goods dating to the Early Intermediate Period and the early Middle Horizon. Interpersonal violence was omnipresent at Uraca: 67 of 100 adults suffered cranial wounds (7 were insults received around the time of death), and 20 individuals were violently decapitated and/or defleshed after death. AMS dates show the individuals buried at Uraca lived from approximately AD 300–650. The terminal portion of this date range corresponds with severe flooding and drought events, as well as the spread of Wari imperial influence throughout southern Peru. To understand whether this violent period is associated with dietary change, we compare childhood and adulthood diets from Uraca individuals to those from contemporaneous neighboring sites, such as Beringa. We compare stable carbon isotope ratios from dental enamel samples at Uraca, which show C_4 plant consumption during childhood. We also reconstruct Uraca diet based on stable carbon and nitrogen isotopes from bone collagen, which reflect late-life diet. If dietary differences from childhood to adulthood correlate with cranial injuries, then food inequality or food insecurity may explain the intense outbreak of violence-related trauma at Uraca.

Scarborough, Isabel (Parkland College)

[212] *Archaeological Patrimony, Spirituality, and the Construction of a New Indigenous Class in Highland Bolivia*

The ancient citadel and urban center of Tiwanaku (c. AD 300–1100) in Bolivia's highland plateau is a notable archaeological site that has been deployed in nation-building discourses by both Bolivia's white minority and its indigenous majority since the inception of this small Andean republic. With the approaching bicentennial of the country's independence from Spain, Tiwanaku has become the symbolic center from which a new generation of upwardly mobile indigenous business and political leaders are invoking this culture's iconography and features to embrace a new take on Andean cosmopolitanism. These religious beliefs are loosely put together from contemporary Andean religious practices, invented traditions, and archaeological publications, and represent the bricks and mortar for this new indigenous class. The disciples of this new faith are quick to critique the sanitized and romantic visions of Tiwanaku's past that endeavored to mediate cultural and racial disparities. However, since this spirituality is inextricably linked to the indigenous nationalism of Evo Morales's administration, it remains to be seen whether this new iteration of Andean religion will provide a platform for a new indigeneity, or whether it will fade into oblivion with the Bolivian people's disenchantment with Morales near the end of his tenure.

Scarborough, Vernon (University of Cincinnati)

[83] Discussant

Scarborough, Vernon [83] see Luzzadder-Beach, Sheryl

Scarre, Chris

[36] *World Prehistories and the Development of a Global Archaeological Narrative*

The origins of prehistoric archaeology as a discipline lie in the New Learning of the sixteenth and seventeenth centuries and derive from a number of sources: antiquarian researches in northwest Europe; European exploration and the encounter with non-European peoples; and speculative accounts of human origins and development. It was only in the nineteenth century that these strands first began to be woven together to create a global narrative of human prehistory. Such a narrative raises a number of problematic issues: regional balance, thematic emphasis, and cross-cultural perspectives. As

early as 1896 Franz Boas criticized the 'comparative method of anthropology,' and some post-processualists of the 1980s and 1990s entirely rejected the validity and utility of cross-cultural analysis. Prehistoric archaeology, however, offers the unique advantage of viewing the development of human societies over the long-term and in global perspective. In the current age of globalization such a perspective should be more relevant than ever before. This paper reviewed the development of global narratives of human prehistory over the past 150 years and explore the theoretical and practical challenges that they present.

Scattolin, María (Museo Etnográfico, Buenos Aires) and Leticia Cortés (Museo Etnográfico, Buenos Aires)

[164] *The Contribution of Northwestern Argentina to the Metallurgical Andean Tradition*

The most ancient metallurgy of precolumbian America originated and evolved in the Andes, reaching great levels of technical sophistication. However, as a few interesting cases of these first moments of experimentation with metals come from Perú, with them comes the popular idea that any technical advance took place in the Peruvian Andes. Because complex societies later emerged in what is now Central Andes, there is a tendency to think that all technological innovations did as well. This could be the cause of the low visibility of metallurgical evidence from Northwestern Argentina. Moreover, early proofs of copper metalworking in the Central Andean region are scant. By contrast, some crucial evidences are emerging in the meridional region of the Andes. Several archaeological finds point to the Southern Andes as an innovative area that made important contributions to the metallurgical traditions of the broader region. Based on the finding of a anthropomorphic copper mask in a funerary context dated to 3,000 years before present, we argue that the Cajón and nearby valleys have been an important focus of copper metallurgy supporting a very early tradition of metalworking in Northwestern Argentina, thus suggesting more than one center for the origin of this technology.

Schaafsma, Polly (Research Associate, MIAC/LOA)

[28] *Pueblo Regalia and the Cosmos: Past and Present*

Images of the human form can be analyzed for what they reveal about social roles, hierarchy, and other identities, as well as culturally determined perceptions about humanity's relationships to the natural environment and supernatural realm. It is proposed that the portrayal of the multitudinous human subjects related to religious ideology and practice in Rio Grande Tradition and Navajo rock art focuses on the interconnectedness of all things, deflecting meaning away from human beings as prime subjects as seen in Western religious art. Rather, informed by ethnographic data, the Native American abstracted, costumed forms along with conflated human/animal subjects, define humanities' intimate link to the cosmos, and their added attributes evoke the supernatural strengths of other living beings, along with animated entities such as rain clouds and the sun. These images themselves are perceived as active agents, attracting the pictured forces, sanctifying place, and facilitating communication with resident spirits. What is pictured on stone extends to the performative dimensions of ethnographic contexts, thereby blurring the boundaries between the ceremonial participants, the representations, and the animistic cosmos.

Schaarschmidt, Maria [333] see Marwick, Ben

Schach, Emily A. (Arizona State University) and Jane E. Buikstra (Arizona State University)

[143] *Dressing the Child: An Analysis of Camisas at Chiribaya Alta*

Children learn and communicate their social identities through dress. Thus, examinations of ancient clothing can reveal the process of socialization in past societies. The presence of child and adult sized camisas in the graves of Chiribaya children suggest that these items communicate more than a child's living identities. Here, we analyze camisas at Chiribaya Alta to examine the process of socialization and the role of death as a potential rite of passage. The site of Chiribaya Alta, an elite Late Intermediate Period site located ~10 km from the ocean along the Osmore River of southern Peru, provides an ideal location for this study because its nine cemeteries represent a large sample of Chiribaya tombs (n = 307), many of which contain preserved camisas. Chiribaya camisas are buried with individuals of all ages and sexes. These garments consist of single web warp-faced structure, are either trapezoidal or rectangular in shape, and are often decorated with lateral stripes and embroidered finishes. Through comparisons between the camisas buried with children to those with adults, we will address the process of socialization in Chiribaya society and whether or not children are acquiring adult identities in death through a funerary rite of passage.

Schach, Emily A. [231] see Gurule, Arman

Schachner, Gregson (UCLA), Matt Peeples (Arizona State University), Paul Reed (Archaeology Southwest) and Kellam J. Throgmorton (Binghamton University)

[301] *Shifting Social Networks and Identity along the Southeastern Edge of the Cibola World*

The work reported here represents the initial results of recent NSF supported field research near Mariana and Cebolleta mesas in west-central New Mexico. These investigations targeted previously known Pueblo II and Pueblo III communities on both public and private lands for detailed mapping and in-field artifact analysis. While the ware-level diversity of ceramic assemblages in the region has long been known, our work employed new methods of analysis of corrugated vessel forming techniques, architectural styles, and lithic source materials and production techniques. Preliminary results suggest variability in regional social ties are present even within individual communities and as represented by different material classes. The results of these analyses contribute to a larger project utilizing targeted fieldwork and reexamination of museum collections along with interdisciplinary analytical frameworks to investigate shifting identity and demography across the southeastern Cibola region during the Chaco through Pueblo IV periods.

Schaefer, Benjamin (Department of Anthropology, Georgia State University), Bethany L. Turner (Department of Anthropology, Georgia State University) and Haagen D. Klaus (Department of Sociology and Anthropology, George M)

[233] *Sacrifice Reconsidered: Interpreting Stress from Archaeological Hair at Huaca de los Sacrificios*

The Inka Empire (AD 1450–1532) practiced flexible forms of statecraft that affected their periphery populations across the cordillera. Lived experiences of different Inka subjects differed in varied ways, which therefore requires nuanced bioarchaeological approaches. This study aims to interpret psychosocial stress through assays of cortisol in archaeological hair from sacrificed individuals (n = 19) recovered in the Huaca de los Sacrificios at the Chotuna-Chornancap Archaeological complex. This site is located in the Lambayeque region on the north coast of Peru and was used as a ritual and ceremonial complex by both the Inka and earlier Chimú states; the remains analyzed here are associated with the Inka period. Utilizing enzyme-linked immunosorbent assay (ELISA) to obtain both overall and segmented cortisol levels, this study examines spikes in cortisol and analyzes these data along with existing data from this study sample. These archaeological cortisol levels are also compared to published cortisol data from living participants, in order to better reconstruct and infer overall stress levels in this cohort. Preliminary results suggest elevated cortisol levels in a number of sacrificed individuals may indicate high levels of psychosocial stress. This analysis also considers other potential confounders as this cohort includes young adult females and subadults.

Schaeffer, Bryan (Florida State University)**[396]** *Cosmogenesis in the Mixtec Codices: Visual Narratives of Place, Emergence, and Movement*

In the Postclassic Mixtec codices, the integral and integrative themes of place, emergence, and movement converge. Neglected in much of the scholarly literature on the sacred books of the Mixtec, the visual representation of supernatural and historical figures' emergence and movement from place to place is an integral component of the codical narratives. Emergence and movement are tethered to and integrative with Mixtec portrayals of place, of various kingdoms through a standardized glyphic sign called a 'toponym.' The significance of emergence and movement or travel underscores Mixtec conceptions of space and directionality, of certain human actions that mirror specific supernatural, generative actions. Such emergence and movement, as visualized in the codices, are tied to primordial cosmogenesis and to the origins of Mixtec ethnogeography. In this presentation I will connect visual narratives from the Mixtec codices with archaeological and anthropological lines of inquiry in order to demonstrate how the Mixtec conceptualized, and therefore visualized, their autochthonous identity in the Mixteca, the region of myriad Postclassic kingdoms. I will also examine and question why place, emergence, and movement were aspects of cultural and historical significance for Mesoamericans in general and for the Mixtec gods and human rulers in particular.

Scharf, Elizabeth (University of North Dakota)**[193]** *Dangerously Close to Big Data: The Intriguing Possibilities of Statistical Time Series Analysis in Archaeology and Paleoecology*

Increasingly, archaeologists are producing larger databases and asking questions about processes that play out at larger scales. To better understand the working of long-term and regional-scale relationships, archaeologists are seeking to compare proxy variables measuring phenomena such as population, climate, and the environment. In this presentation, statistical time series in the time and frequency domains is used on sample datasets to illustrate the benefits of this approach in archaeology and paleoecology. For such applications, statistical time series analysis promises to reveal interactions, lead-lag relationships and statistically partition variability in ways that other approaches (such as visual inspection, regression, and correlations) cannot, providing insights into possible causal relationships and revealing subtle interactions that are otherwise hard to assess.

Scharlotta, Ian (Aix-Marseille University)**[330]** *Investigating Temporal Shifts in diet and behavior at Shamanka II, Cis-Baikal, Siberia*

Using a high-resolution chronological framework developed for Early Neolithic Cis-Baikal, Siberia, grave goods and stable isotope data are analyzed for specific relationships between functional items, prestige goods, and diet. Evidence suggests increasing importance of fishing during two separate phases of cemetery use at Shamanka II. Dietary changes and interlinked social structures may have contributed to differentiation in the cemetery. Fishing specialists are identifiable in grave assemblages. Individual fishers did not employ methods consistent with intensification. Their role in providing important food resources did not translate to apparent prestige or wealth in certain grave goods at Shamanka II. Bulk data have indicated the presence of a mixed population in terms of origins and diet, the need for caution prior to their use in support of clear behavioral inferences, and further refinement of the methodological approaches. Dentine micro-sampling allows the direct examination of three primary data goals, 1) weaning patterns; 2) mobility between three primary types of watersheds; and 3) the possibility and nature of stored resources used to ameliorate the returns of seasonal subsistence activities. The ramifications of these three data goals support different subsistence approaches and sociopolitical organizational structures within middle Holocene Cis-Baikal hunter-gatherers.

Schauer, Peter [216] see Edinborough, Kevan

Scheel-Ybert, Rita (Museu Nacional)**[174]** *Fire and Feasting: The Role of Plants in Brazilian Shell Mounds Funerary Rituals*

Shell mounds occurring along most of the Brazilian coast, locally named "sambaquis," testify of an occupation dated from at least 8000 to c. 1000 years BP. Although traditionally considered as waste deposits, they are now largely recognized as funerary sites constructed by sedentary fishers. The development of archaeobotanical studies in the Southern/Southeastern Brazilian coast is demonstrating the consumption of a wide variety of wild and domesticated plants, pointing to a system of mixed economy, where fishing and gathering might be associated with horticulture. Archaeobotany has also pointed out to the importance of plants as funerary offerings and/or its consumption in ritualistic or feasting ceremonies. Concurrently, anthracological studies highlight the importance of fire as a central element in sambaqui builder's life, one which connects the worlds of the living and of the dead. Hearths and fire remains, invariably present around the burials, and the large amount and diversity of charcoal in funerary areas suggest that ritual hearths were continuously or permanently held. The mounds, which for their size, monumentality, and funerary role are already considered as landmarks and memory places, became by means of the ever-burning flames even more visible in the landscape.

Scheiber, Laura (Indiana University) and Michael Peterson (National Park Service)**[336]** *Exploring Photogrammetry and Aerial Archaeology for Innovative Mapping and Surveying at Heart Mountain, Wyoming*

Heart Mountain is an impressive geological anomaly visible across the Bighorn Basin of northwestern Wyoming. This unusual-shaped butte stands out among the many mountain ranges and basins in this part of the state. Identified on the earliest fur trapper maps, Heart Mountain has served as a recognizable landmark for centuries. The Crow (or Apsaalooké) tell stories of vision questing, buffalo hunting, camping, traveling, and fighting at Heart Mountain, and it was part of their reservation in 1868. Known as Foretop's Father or Ihkapiliish lilapxe, it was (and still is) considered to be the adopted father and protector of the Crow people. The archaeology surrounding the mountain is rich with stone features such as cairns, trail markers, fasting beds, and tipi rings. High-precision technology applied to document surface architecture at these sites has focusing on establishing regularized patterns of domestic life and distributions of resources across the broader landscape. In this paper we discuss innovative efforts to further understand spatial distribution by employing innovative techniques for the study of modest stone features on the mountains and plains of western North America. We combine data from photogrammetry and aerial archaeology, allowing for three-dimensional reproductions of the features and surrounding topography.

Scherer, Andrew [118] see Alcover Firpi, Omar A.

Schiappacasse, Paola (Universidad de Puerto Rico)**[289]** *Constructing Stories from Archaeological Evidence and Documentary Sources*

The archaeological collections crisis we have been facing for the last couple of decades has forced many of us to rethink how to conduct research without adding to the problem. Although the idea that you need to excavate in order to do "archaeology" still permeates the opinions in academia, we have been seeing more research projects that revisit archaeological collections. Therefore, how can we make archaeology students aware of other research possibilities? The archaeological excavations conducted in five urban blocks of Ballajá, a nineteenth-century area located on the northwest part of San Juan, Puerto Rico, yielded a large collection of urban material culture. Twenty-four years after the completion of the excavations the majority of

the collection still has not been analyzed, and there is limited access to researchers. As part of a larger project, I started developing smaller investigations with undergraduate archaeology students in an effort to rethink, and reinterpret this archaeological collection. In this paper, I will present the advantages of using the data from censuses and newspapers which can be included in writing stories about people, places and objects.

[93] *Discussant*

[289] *Chair*

Schieber de Lavarreda, Christa (National Archaeological Park Takalik Abaj) and Miguel Orrego (National Archaeological Park Takalik Abaj)

[182] *Where Is Tak'alik Ab'aj within the Fabric of Preclassic Interrelations?*

Three decades of research at Tak'alik Ab'aj have repeatedly confirmed that this ancient site at the southwestern piedmont of Guatemala was an important link of the transcultural trade-network along the Pacific littoral of Mesoamerica. This presumes strong and functional interactions among the stronghold-players of this hanseatic system operating during a given timespan by means of a common shared concept proposed as "market of rituality," permeated in each case according their own local nature in their cultural and economic realm. This is examined anew under the framework of the current discussion of chronological revision.

Schiels, Rebekah

[97] *Archaeology Fairs: Measuring Informal Learning*

Archaeology Fairs are held across the United States in honor of Archaeology month and the International Day of Archaeology. Students and families are exposed to many facets of archaeology, tools of the trade, the difference between archaeology and paleontology, and what to do when they find artifacts. Often this learning takes place in an informal setting, a museum or university campus. So what are students actually learning at these Archaeology Fairs and how can we measure their understanding? Project Archaeology, a national archaeology education program, hosts an annual Junior Archaeology Day at the Museum of the Rockies in Bozeman, Montana. Project Archaeology staff measured student's understanding of archaeological concepts at the 2015 and 2016 fairs. This paper discusses the results of this research, the difficulties of hosting an archaeology fair in a paleontology museum, best practices for measuring informal learning, and improving fair activities based on research results.

[97] *Chair*

Schiepati, Frank [175] see Hayward, Michele

Schiffels, Stephan [143] see Posth, Cosimo

Schilling, Timothy (Midwest Archeological Center)

[283] *Monks Mound: Retrospective Thoughts and Prospective Potentials*

Monks Mound stands as the pinnacle of platform mound building at Cahokia and in North America. Built very rapidly near the end of the eleventh century AD, it was the largest single public works project undertaken in North America until the nineteenth century. At first glance, the mound appears as an immutable fixture on the landscape yet a closer examination shows that the mound has several severe structural deficiencies that may eventually lead to collapse. Archaeologists and site managers have long studied the mound to understand its internal structure and potential long-term solutions to the structural problems. Researchers have developed multiple theories about how and when the mound was built. The most recent work reveals that these problems are inherent in the materials and techniques used in construction. While the builders were intimately familiar with their materials, because of the scale of the construction, Monks Mound may be more susceptible to erosion and slumping than smaller earthen mounds. Recent work demonstrates that mound builders of Monks Mounds and other Mississippian sites successfully coped with and repaired problems during construction. More large-scale geoarchaeological studies are needed to both understand the mound and maintain it for future generations.

Schilt, Flora [146] see Thompson, Jessica

Schleher, Kari (Crow Canyon Archaeological Center), Kate Hughes (Crow Canyon Archaeological Center), Jamie Merewether (Crow Canyon Archaeological Center), Michael Lorusso (Crow Canyon Archaeological Center) and Grant Coffey (Crow Canyon Archaeological Center)

[301] *Surface Archaeology as Site Assessment: The Haynie Site and the Northern Chaco Outliers Project*

Crow Canyon Archaeological Center is beginning a multiyear project at the Haynie site, a Chaco outlier in the central Mesa Verde region of southwest Colorado. In 2016, the goal was to assess the spatial and temporal characteristics of Haynie through in-field analyses of pottery and chipped-stone artifacts from the surface. This was done via systematic dog-leash collection units placed across the site, as well as judgmental analysis of artifacts in disturbed contexts. Through analyses of artifacts from dog-leash units over the entire 5-acre site property, we discuss temporal and spatial patterning reflected by observed pottery and lithic raw material distributions. Although surface architecture reflects the Pueblo II period (AD 900–1150) component at Haynie, the surface-based artifact analyses demonstrate much greater time depth, with pottery types suggesting continuous use from the Basketmaker III period (AD 500–750) through the Pueblo III period (AD 1150–1300). This project will help guide test excavations which will begin in 2017.

Schlösser, Nina Maria [169] see Smith, Geoff M.

Schlotzhauer, Udo (German Archaeological Institute), Denis Zhuravlev (State Historical Museum Moscow), Daniel Kelterbaum (University of Cologne), Anca Dan (AOROC-CNRS, Ecole Normale Supérieure Paris) and Hans-Joachim Gehrke (University of Freiburg)

[221] *Landscape Reconstruction at the Black Sea Coast*

Landscapes are subject to ongoing geological transformation which change, hide or even destroy for their part anthropogenic remains. The reconstruction of historic landscapes as well as the causes of their changes is subject of geoarchaeology. A noteworthy example for a reconstruction of the historical landscape of a whole region is demonstrated by an interdisciplinary and international project on the South Russian Taman peninsula in the North Pontus. The new insights that were made by geoarchaeology to the phases of the geomorphological formations of today's Taman Peninsula during the Holocene allow now to interpret the archaeological sites as well as together with historians and classical philologists the ancient topography in another way. Modern landscape reconstructions on the one hand and the ancient written sources on the other hand, and their relation to the known archaeological sites cannot in many cases be brought convincingly in harmony. Hence, numerous drilling cores were taken in several years at well-chosen places. The results of these cores were determined chronologically according to their radiocarbon dating. Unexpectedly appeared that the Taman Peninsula was in ancient times an archipelago and therefore was beside the still existing Strait of Kerč a second waterway further in the east.

Schmader, Matthew [50] see Ryan, Ethan

Schmid, Magdalena (University of Iceland)

[81] *Recreating the Timing and Patterns of First Peopling with the Bayesian Approach*

The timing and patterns of first peopling offer exciting opportunities to understand the legacies of colonization. In particular, islands are defined territories where colonization processes can be tracked through a rigorous synthesis of empirical data and a systematic application of Bayesian statistics. Iceland provides one of the world's premier case studies for human interactions of pristine ecosystems because its colonization in the ninth century occurred relatively late in history. Furthermore a suite of tephrochronological and radiocarbon data helps define this process in Iceland. This study systematically reassesses 500 radiocarbon dates from the settlement period that have been a matter of fierce contention. Bayesian statistical modeling is used to evaluate the reliability of the data using calibration methods; material classes; life span; isotopes; archaeological contexts and associated tephra layers of 300 settlement and 25 burial sites. The data summarized here for the first time allows a countrywide comparison and a classification of these settlement sites into pre-Landnám (AD pre-877), Landnám (AD 877–939) and post-Landnám (AD 939–1104). It demonstrates that it will be possible to reconstruct the tempo and development of the colonization process in decadal resolution by more systematically utilizing the dating potential of tephrochronology and radiocarbon dates with Bayesian approaches.

[32] *Discussant*

[32] *Chair*

Schmidt, Isabell [165] see Bradtmöller, Marcel

Schmidt, Mary

[302] *The Kwajalein MIA Project*

Kwajalein Atoll, Republic of the Marshall Islands, is located in the western Pacific, ~2,100 miles southwest of Hawai'i and is home to U.S. Army Garrison Kwajalein Atoll. During World War II, it was the site of Operation Flintlock and major bombing operations in the Pacific Theater. The Kwajalein MIA Project (KMP) is a public archaeology project dedicated to identifying aircraft and wreckage in the atoll lagoon that are linked to missing U.S. servicemen from World War II. The project is comprised of an all-volunteer team that includes veterans, active-duty military, and civilians that specialize in boat operations, diving, archaeology, fundraising, and historical research. The KMP has located 3 of 8 American aircraft that were lost in the lagoon and are currently facilitating efforts with the Defense POW/MIA Accounting Agency to recover the associated servicemen. This project exhibits how a public archaeology project can help provide closure to MIA-families who have waited decades to hear of their loved ones' fates but also how it can function as a source of pride and healing for team members who have more recently served our country and for those who have been affected by the invisible impacts of war that are not exclusive to those in uniform.

Schmidt, Morgan (Museu Paraense Emilio Goeldi), Anne Rapp Py-Daniel, Marcos Pereira Magalhães, Helena Lima and Vera Guapindaia

[327] *Daily Practices and the Creation of Cultural Landscapes in Amazonia*

Short-term, small-scale interactions between humans and the environment may result in profound transformations of that environment over time. Recent archaeological research in Amazonia has revealed the extent that daily practices, such as refuse disposal or cultivation, have modified the soil in the vicinity of ancient and modern settlements. The fertile anthropic soil known as terra preta, formed mainly through the discard of refuse around habitation areas, is an example of how quotidian actions by humans and other organisms together created these landscapes. These activities have resulted in a widespread pattern where similar features are found in ancient settlements across the broad Amazon region. The landscapes have been documented in several widely spaced areas and in differing environmental and cultural contexts, including large sites along major rivers as well as smaller sites in interfluvial areas. Daily activities resulted in patterns of modified soils and geomorphology that reflect the organization and use of space in settlements. Once these features are formed, they may serve as landesque capital that is repeatedly used by succeeding generations or occupations.

Schmidt, Peter (University of Florida)

[161] *Sacred and Magnificent, Degraded Landscapes: Crater Rims as Sacred Places and Transformed Spaces in Western Uganda*

One of the most vexing problems in the archaeology of eastern Africa is the absence of burial evidence from deep antiquity. This issue is now moot with the documentation of multiple burials on the narrow rims of steep volcanic calderas in far western Uganda. Dating to the early first millennium CE, these cemeteries contain well-preserved individuals who lived in a forested environment they modified by fire while subsisting on a mixed diet of fish, game, and agriculturally produced grains. Previously characterized as hunter, fishers, and gatherers, these pioneer forest dwellers were more varied than previously believed. They buried their dead with large funerary urns on the western sides of spectacular calderas where the first rays of the rising sun strike—suggesting beliefs linked to celestial cycles. Responsible for pulses of forest clearance over the last millennium BCE and first millennium CE, they were replaced by major but short-lived agriculturally based population in the mid-second millennium CE that utilized large scale forest clearance and agriculture on the crater slopes.

Schmied, Sage

[263] *Excavating the Intertidal at Hup'kisakuu7a, a Summary and Artifact Analysis*

The Barkley Sound region of Vancouver Island has a rich archaeological record that is important to the Nuu-chah-nulth people. Due to changing sea levels, places that were once exposed are now underwater, meaning that the earliest possible occupations cannot be excavated. We excavated in the intertidal at Hup'kisakuu7a because of the possibility of finding evidence of human occupation between 5500–7000 cal years BP when sea levels were just a few meters below modern. From the excavations conducted we found fire-cracked rock (FCR) and possible artifacts which point to humans being present at this time. However, due to the lack of dateable samples and uncertainty of artifacts it is not something that can be confidently concluded. Further work is required to be done in the intertidal at Hup'kisakuu7a, especially because the artifacts found at Hup'kisakuu7a are so promising.

Schmitt, Katharina [223] see Schöne, Bernd R.

Schneck, Bill [287] see Ellwood, Emily

Schneider, Anna

[246] "The Best Conference I've Ever Been To": A Case Study in Science Communication Training

In 2013, a group of Harvard graduate students launched ComSciCon—a science communication workshop for graduate students—with the goal of empowering young scientists to share research in their field with broad and diverse audiences. Each year since, 50 graduate students have come together every summer to spend three days undergoing intensive science communication training, interacting with expert panelists, and composing original pieces for publication. This paper provides an overview of ComSciCon and its science communication training efforts, including improvisation sessions, K-12 curriculum development, mock interviews, and pitch slams. A series of follow-up surveys have demonstrated that ComSciCon has a lasting longitudinal impact on alumni; namely, attendees gain confidence in their science communication skills, engage in more public outreach, and submit more articles to popular science publications. While ComSciCon is geared toward STEM (Science, Technology, Engineering, and Math) graduate students in general, the ComSciCon model is also applicable to communication and outreach training in archaeology. By learning from the success of ComSciCon, we can better equip archaeologists to communicate their research to the public.

Schneider, Joan [27] see Rosen, Arlene

Schneider, Tsim (University of California, Santa Cruz)**[168] *The Ritual of Return: Mounded Landscapes in Colonial California***

In the United States, prehistoric and historical archaeology subfields are characterized by distinct intellectual histories, methods, and theoretical frameworks that continue to guide where archaeologists apply their craft. For California prehistorians, deeply layered shell mounds long represented ideal sites for chronology building. Until recently, shell mounds were also unlikely places for historical archaeologists to investigate interactions between Native Americans and colonial institutions. Building on a recent study comparing shell isotope data to colonial mission records, this paper explores Native American mobility and the possibility of persistent visits to San Francisco Bay shell mounds during the Mission Period (1776–1830s) and afterward. Focus here is on the ritual of return, or Native people's trips to and reuse of aged mounds, for assessing the resiliency of people and mounded landscapes.

Schnitzer, Laura Kate (New South Associates)**[377] *Changing Tides, Rising Waters: Wetland Archaeology on Georgia's Lower Coastal Plain***

The Ogeechee River Valley is an archaeologically under-studied region of southeastern Georgia, but the intensive survey of a state owned wetland mitigation property changes this insufficiency. The recently completed Pierpont Tract survey, commissioned by the Georgia Department of Transportation, identified sites with intact deposits from multiple precontact occupations, spanning from the Late Archaic to the Middle Mississippian periods. Many of these resources lie in seasonally inundated areas traditionally considered too low and swampy for long term habitation, yet cultural deposits were often identified in deeply buried primary contexts. Though inaccessibility and flooding protect the Pierpont sites to some extent from modern disturbances like logging and development, rising sea levels also pose an inevitable threat. The Pierpont survey provides a unique opportunity for investigating a dynamic landscape in a changing climate. Data from the project fills gaps in our understanding of precontact occupation on the interior coastal plain, changes notions of archaeological probability in wetland zones, and initiates a shift in methods used to inventory backswamps and floodplains threatened by rising sea levels.

[377] Chair

Schoeninger, Margaret (UC-San Diego), Corinna Most (University of California, San Diego), James Moore and Andrew Somerville (University of California, San Diego)**[284] *Influence of Animal Proxy Choice on Use of Carbon, Nitrogen, and Oxygen Stable Isotope Ratios for Determining Past Environmental Variables***

The stable isotope ratios of carbon, nitrogen and oxygen ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$, and $\delta^{18}\text{O}$ values) in animal tissues show promise as environmental indicators. We evaluated the use of chimpanzee hair and leporid (jackrabbit and cottontail) bones. Chimpanzee hair $\delta^{13}\text{C}$ values correlate negatively with mean annual precipitation (MAP) as expected based on isotope variation in C3 plants, whereas $\delta^{15}\text{N}$ values do not because of diet selectivity. Leporid bone $\delta^{13}\text{C}$ values do not correlate with MAP because of leporid feeding on C4 plants, but both $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values correlate significantly with temperature. The lack of significant temperature variation across chimpanzee sites negates testing for temperature-related variation in chimpanzees. Leporid bones also show significant correlations between $\delta^{18}\text{O}$ and MAP as expected for a nondrinking species. Our results suggest that mammalian $\delta^{13}\text{C}$ values should be useful general indicators of MAP in C3-feeding animals and of temperature in C4-feeding animals. $\delta^{15}\text{N}$ values need to be evaluated on a taxon-specific basis. Each animal proxy must be considered in the context of its feeding and drinking ecology in order to interpret the isotope data properly. All three isotopes have potential for use with museum specimens in studies of climate change and for reconstruction of paleohabitats.

Schollmeyer, Karen (Archaeology Southwest)**[303] *A Natural and Unnatural History of Faunal Change in Southwestern New Mexico since AD 500***

An important intersection between archaeology and the study of natural history lies in understanding the long-term processes of human-environment interaction that affected local biotas in the past and have shaped contemporary landscapes. This study integrates information from archaeological faunal assemblages and historic and modern data from the major watersheds of southwestern New Mexico—specifically, the upper Gila-San Francisco and Mimbres drainages—to examine changes in the status and distributions of animals and their environments over the past 1,500 years of human occupation. Using this approach we seek to clarify the roles the presence and activities of prehispanic farmers, the subsequent effects of Europeans and their livestock, and concurrent climatic factors have played in this region's contemporary faunas and landscapes. Contributing a clearer understanding of changes to local faunas and their environments over long periods of time can assist contemporary restoration efforts by providing more realistic benchmarks for emulating prior states of land health.

[303] Chair

Schöne, Bernd R. and Katharina Schmitt (Institute for Geology, University of Hanover, Germ)**[223] *Effects of Sample Pretreatment and Contamination on Bivalve Shell and Carrara Marble $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ Signatures***

Stable isotope signatures of bivalve shells serve as important proxies of past environmental conditions. However, such data can be biased as a consequence of physical and chemical pretreatment and contamination during sampling. To systematically assess these issues, homogenized aragonitic shell powder, as well as Carrara marble powder (calcite) were exposed to ultrasound, a set of different staining solutions and cleaning agents that are typically employed in bivalve sclerochronology. Furthermore, these materials were artificially contaminated with periostracum, Alcian Blue and cured adhesives. Whereas some treatments had no effects, severe isotope shifts were observed after immersion in Feigl's solution or contamination with certain epoxies. The majority of tested treatments conducted with the carbonate powders and contaminants added to them caused only minor to moderate isotope offsets. In conclusion, pretreatment of bivalve shells with an intended use for isotope analysis should be kept at an absolute minimum and contamination with adhesives etc. should be avoided. Specimens from museum collections may be of limited value for isotope studies, unless the

history of sample treatment is known. Although only a few of the tested substances and methods strongly biased the isotope signatures, even small changes can accumulate to levels that are unacceptable for environmental reconstructions.

Schöne, Bernd R. [223] see Leclerc, Natasha

Schorer, Birgit [173] see Rageot, Maxime

Schorsch, Deborah [164] see Boswell, Alicia

Schott, Amy (University of Arizona, Petrified Forest National Park)

[87] *Using Soil Geomorphology to Understand Dry-Farmed Agriculture in Eolian Sediments in Northeastern Arizona*

The Petrified Forest National Park in northeastern Arizona has a long record of prehistoric occupation, including within extensive deposits of semi-stabilized dunes and sand sheets. It has been hypothesized that during the Pueblo periods, inhabitants farmed these eolian soils. Eolian sands are not typically conducive to dry-farmed agriculture; however, dune farming is known ethnographically, and has been inferred in archaeological contexts on the southern Colorado Plateau. This paper investigates underlying geology to better understand landscape conditions that may have allowed eolian deposits to be conducive to dry-farmed agriculture. Soil geomorphic studies have shown very weakly developed soils with high clay content. This paper uses clay mineralogy and micromorphology to further understand the source of the high clay content, which may have increased water holding capacity of eolian sediments. This research will contribute to a better understanding of how the area's early farmers interacted with a dynamic eolian environment.

[253] *Discussant*

Schott, Amy [304] see Reitze, William

Schoville, Benjamin (University of Cape Town), Jayne Wilkins, Kyle Brown, Simen Oestmo and Terrence Ritzman

[40] *Functional Implications of Backed Piece Variability for Prehistoric Weaponry in the Middle Stone Age*

MSA backed pieces are often thought to be components of projectile armaments; however, our limited understanding of their functional characteristics as projectiles precludes understanding the adaptive problems they may have solved. Despite widespread acknowledgment of raw material differences and inter- and intra-assemblage morphological variability, whether backed piece morphology reflects functional, economic, or stylistic variation has a paucity of empirical support. Here, the functional differences in backed piece morphology and hafting configuration when used as projectile armatures are examined. Hypotheses that relate backed piece function to morphology and hafting arrangement are tested using experimental and actualistic projectile replications against animal and gelatin targets. The results of this study show that the morphology of backed pieces plays a relatively limited role in their performance as long-range projectile armatures. However, hafting orientation has very different performance characteristics for arrows shot at ballistics gelatin compared to animal targets. Our results suggest that MSA backed pieces hafted as armatures were unlikely to have been used with small, low-powered bows, but would have been lethal with a high-velocity delivery system.

Schoville, Benjamin [153] see Cleghorn, Naomi

Schrader, Sarah [219] see Buzon, Michele

Schreg, Rainer [90] see Harris, Susan

Schreiner, Nina and Kathleen M. S. Allen (University of Pittsburgh, Department of Anthropology)

[52] *Early Contact Period Shell Trade and Bead Manufacture at a Cayuga Iroquois Site*

During the early contact period in Northeastern North America, Native groups traded with both other Native groups and a variety of Europeans. Early trade began on a small scale with all parties eager to gain goods. Investigations at Carman, a Cayuga Iroquoian (Haudenosaunee) site occupied in the late 1500s, produced a quantity of shell beads, along with a small number of metal items refashioned from European copper and brass fragments. This paper is an analysis of the worked and unworked shell from the site. The majority of shell beads found at Carman are discoidal, likely used for personal ornamentation, and the standardized shapes of these beads hint at manufacture using shell column blanks traded west from the Atlantic coast. In addition, the large quantity of shell material (more than 50 beads and 675 g of unworked shell) found at this domestic site, along with apparent bead blanks, suggests that shell bead manufacture occurred at Carman. The shell and shell bead data situate the Cayuga within local and regional trade networks. This analysis also sheds light on changing processes of trade, manufacture, and adornment in the early contact period.

Schreiner, Thomas [337] see Hansen, Richard

Schroeder, Sissel (University of Wisconsin-Madison)

[163] *Travels and Traverses, Pilgrimages and Passages: Alternative Concepts of Interaction*

When confronted by the presence of nonlocal ceramics and stone tools, variations in artifact styles, the spatial distribution of settlements and settlement hierarchies, and evidence thought to indicate intergroup conflict, archaeologists typically turn to the general concept of "interaction" to explain these material residues. Furthermore, interaction scenarios sometimes are premised on the notion of inequities in resource access. When cultural behemoths like Cahokia are implicated in scenarios of interaction in distant locales, the interactions often are described as unidirectional moments in time, in part as a byproduct of interpretive constraints placed on us by the coarse-grained chronologies that currently exist for much of the Eastern Woodlands. In this paper, I unpack these issues, particularly looking at the question of how interaction registers in the archaeological record, problems of equifinality in the interpretation of behavioral origins of material culture, and I advocate for models that consider interactions in multidirectional and serial terms.

[269] *Discussant*

Schroll, Andrew (Tulane University), Grant McCall (Tulane University), Theodore Marks (University of Iowa) and James McGrath (University of Iowa)

[153] *Behavior Change in Hunter-Gatherers of the Namib: A Reanalysis of the Terminal Pleistocene Lithic Technology at the Mirabib Hill Rockshelter, Western Namibia*

Originally excavated in the early 1970s by Beatrice Sandelowsky, the Mirabib Hill Rockshelter is located roughly 250 km southwest of Windhoek, Namibia, in the Namib-Naukluft National Park. This poster describes our reanalysis of the lithic technology recovered from Mirabib during the Sandelowsky excavations. The lithics examined in this poster were recovered from the lowest levels of the Sandelowsky excavation, just above bedrock, and date to around 19.5ka. This poster discusses the knapping strategies, patterns of tool design, and technological organization inferred from the Mirabib lithic assemblage in relation to shifting settlement systems between the last glacial maximum (LGM) and the termination of the Pleistocene. When other sites in the region are considered, we argue that the millennia surrounding the LGM were a turning point in the lifeways of hunter-gatherer populations in the Namib Desert. In this respect, we propose a model in which ecological and demographic changes induced local populations to move around the landscape in increasingly extreme ways and to occupy residential sites with greater intensity. Finally, we discuss some ways in which Namib Desert foragers may have coped with problems caused by increasingly extreme mobility patterns through the organization of their technological systems.

Schroll, Andrew [54] see Marks, Theodore

Schubert, Ashley (University of Michigan)

[160] *Mississippianization in Late Pisgah Communities in the Appalachian Summit of North Carolina*

Three Mississippian villages from the Pisgah period (AD 1200–1600) in western North Carolina are reviewed and discussed—the Cane River Site (31Yc91), the Warren Wilson Site (31Bn29), and the mound and village at the Garden Creek Site (31Hw1). The elements of each community's built environment, household architecture and domestic practices are evaluated and considered along with new radiocarbon dates from each site. These three Pisgah communities are situated in an unusual mountain environment for Mississippianization, reflecting the often overlooked variation in incorporation along the Mississippian frontier. This Pisgah tradition demonstrates how the environment within the Appalachian Summit influenced the late timing, tempo, and extent of adopting Mississippian practices. This region therefore provides a significant insight in discussions of variability in the processes of expansion and integration along the expanding edge of the Mississippian world.

[160] *Chair*

Schubert, Ashley [160] see Purcell, Gabrielle

Schucroft, Ryan [263] see Badger, Emily

Schuenemann, Verena [203] see Krause, Johannes

Schuldenrein, Joseph (Geoarchaeology Research Assoc)

[173] *Organic Residues in Archaeological Context: A Historic Overview*

Geoarchaeology is increasingly concerned with the analysis of perishable remains related to both the geological and archaeological components of a sediment matrix. Geological components range from measuring the age of ^{14}C to quantifying and classifying the organic content of an ancient soil, to identifying the source of organic materials in anaerobic (poorly drained) landscapes. More recently, organic matter studies have been applied to historic artifacts and the deposits in which they are found. Both physical and chemical processes account for the mobilization of organic matter and its disaggregation at an archaeological site. An understanding of these processes is pivotal to reconstructing the site formation history of an archaeological location. We review the origins of progressively more sophisticated analyses of "archaeological organics" through time. We identify the processes of organic disaggregation in a variety of environmental and cultural settings. Organic matter analyses can take a variety of forms from visual assessments, to geo-chemical testing and microscopic inspection and probing at high levels of resolution.

[6] *Discussant*

Schulting, Rick J.

[330] *Explaining Isotopic Variability among the Hunter-Fisher-Gatherers of Lake Baikal*

Lake Baikal is unique in continental northern Eurasia for the size of its large hunter-gatherer cemeteries with good preservation of human bone. Many hundreds of stable carbon and nitrogen measurements are available on human bone collagen, made over the last two decades. The isotope ecology of Lake Baikal is very complex and highly variable, showing one of the largest ranges of $\delta^{13}\text{C}$ values in the world. Thus, it is not surprising that the human results show considerable variation. This contribution attempts to account for this variation, exploring factors including location, date, individual mobility and within-group differential access to aquatic resources. A model is proposed linking the complexity of the local/regional isotope ecology with the standardized range of variability observed in human datasets.

[254] *Discussant*

[330] *Chair*

Schulting, Rick J. [30] see Fernández-Crespo, Teresa

Schulting, Rick J. [231] see Swift, Jaime

Schultze, Carol (HRA-Seattle/Collasuyo Archaeological Research Institute [CARI-Peru]) and Colleen Zori (Baylor University, Waco, Texas)

[164] *Silver Production and Inka Expansion in the South Central Andes*

Silver was an important component of the Andean prestige economy with bestowal and display of silver and silver-alloyed objects constituting a vital tool of Inka statecraft. The quest for mineral wealth was thus a motivating factor for Inka conquest of the South Central Andes. Nonetheless, the impacts of imperial incorporation on the organization and technology of metal production differed across this region of the empire. Focusing on the purification of silver ores, we present two case studies of Late Horizon metal production: the Puno Bay of northwestern Lake Titicaca, and the Tarapacá Valley of northern Chile. Each study combines regional survey data on the distribution of sites related to metal production with excavation at specific metallurgical sites and analyses of silver production debris. We document the spatial organization of the production process, from mining to refining as well as the

technologies involved. We show that Inka silver production in each location was shaped by the practical demands of the silver production chaîne opératoire as well as a combination of imperial goals and local circumstances.

Schulze, Niklas (FCSyH-UASLP)

[164] *Metallurgy in America: What Do We Know about Its Development and Diffusion?*

Academic interest in "New World" metallurgy is more than a century old and has come a long way. New analytical technologies have allowed us to understand in ever greater detail the composition and structure of metal objects found in archaeological contexts. This makes it possible to identify raw materials, study production processes and life histories of artifacts. While our progress in questions of detail is indisputable, the opinions concerning the general development and diffusion of metallurgy in America have not been revised or questioned until now. This presentation will try to assess if it is necessary to change the current discourse and formulate new questions.

Schurr, Mark (University of Notre Dame)

[30] *Nitrogen Stable Isotopes and Infant Feeding Practices: Taking a Long View*

Over the past 20 years, nitrogen stable isotope ratios have been used to explore infant feeding practices in ancient populations. In spite of many productive studies, uncertainties remain about how to interpret juvenile isotope ratios in regard to comparing feeding behavior across different populations, and the relationships of infant feeding practices to health, subsistence modes, environment, and social organization. Infant feeding practices are likely to be constrained by the biological demands of infants and mothers, but may vary within those constraints based on factors such as degree of sedentism, population size, fertility, class and ethnic variations, and the presence or absence of foods that can be substituted for breastmilk. Juvenile and adult stable nitrogen isotope ratios from six sites in the midcontinental USA, which span almost 5,000 years, provide an opportunity to examine the relationships between infant feeding practices as reflected in nitrogen stable isotope ratios across many dimensions. Subsistence practices ranged from hunting and gathering, through agriculture without domesticated animals, to early industrial agriculture. The intersite comparisons provide an opportunity to assess the range of infant feeding practices that are possible in a single environmental zone and how they systematically varied with biological constraints and cultural practices within and between populations.

Schurr, Mark [102] see McLeester, Madeleine

Schwadron, Margo (NPS-Southeast Archeological Center)

[377] *Climate Change and Threatened Paleoecological Landscapes of South Florida*

South Florida contains millions of acres of wetlands, subtropical estuaries and prehistoric waterways interconnecting thousands of tree islands and shell work islands, comprising one of the largest and most complex prehistoric maritime landscapes worldwide. Recursive human and natural dynamics shaped these landscapes over deep time, but will soon be lost by rising sea level. Integrated archaeological and paleo-ecological studies are critical to understanding the long term impacts of humans on the development, emergence, evolution and future of these landscapes before irreplaceable data is lost by climate change impacts. We present case studies for site protection and mitigating site loss, which include integrating ecosystem restoration, building living shorelines, and engaging locals in citizen science for heritage stewardship and resource management.

[1] *Discussant*

Schwartz, Christopher (Arizona State University)

[192] *Exploring the Deposition of Fauna in Public Spaces in the Tonto Basin, Arizona*

The nature and performance of public rituals and have long interested archaeologists studying the prehispanic U.S. Southwest. The frequent deposition of animals in public spaces suggests that certain animals were important parts of public rituals and the broader activities surrounding them. In this poster, I explore the deposition of ritual fauna in the Tonto Basin area of central Arizona. Typically considered "Hohokam," the Tonto Basin exhibits influence from the neighboring Sinagua region and the Puebloan northern Southwest. The emergence of the "Salado phenomenon" and socially integrative architecture in the region is evidence of broad sociopolitical and religious change involving specific treatments and storage of fauna. I use ethnographic evidence and faunal analyses to ask whether ritual fauna cluster in socially integrative spaces and what implications these patterns had for integrating migrant Puebloan populations with local people. I find that ritual fauna cluster in room contexts specifically associated with platform mounds. While faunal diversities in public spaces are normal given sample sizes, non-socially integrative architectural contexts fall below expectations, suggesting a centralization of ritual practice and storage. Ultimately, specific taxa were targeted by Tonto Basin communities for the enactment of public activities, which aided in the integration of nonlocal communities.

Schwartz, Christopher [23] see Shepard, Lindsay

Schwartz, Erin (College of William and Mary)

[74] *Inequality in the Academy: An Intersectional Analysis of Young College Men in Nineteenth-Century Lexington, Virginia*

What can intersectionality offer to a study of an all-male antebellum dormitory? While this approach has typically been used to identify and combat race- and gender-based discrimination, this paper argues that intersectional theory can also illuminate subtle class- and age-based inequalities among historic individuals of the same gender and race. Archaeological investigation of Graham Hall, a combined dormitory/classroom space/chapel located on the campus of Washington and Lee University in Lexington, Virginia, has revealed a diverse array of material culture representing multiple activities, individuals, and social statuses. Viewed through an intersectional lens, Graham Hall becomes a locus of intersecting identities and hierarchies: as young men from disparate places and classes negotiated their positions within the student body, age-based hierarchies contributed to tensions and occasional power struggles between students and older community authorities. In engaging intersectionality in an atypical way, this research highlights the antebellum student body (and their associated artifacts) as not a single homogeneous whole, but as a spectrum of multivalent and multilayered axes of identity.

Schwartz, Lauren E. (UC, Riverside)

[80] *Understandings of Household Architecture at Night in the Middle Chamelecón Drainage, Honduras*

Interpretations of Mesoamerican households tend to focus on activities that might rightly be associated with daylight hours and mostly informed by material culture that is moveable and multipurpose. However, intensive examinations of the non-movable or architectural composition of household settings have recently revealed even more about these diverse and socially complex domestic spaces. This examination initiates an analysis of the interaction between humans and their built-environment as it pertains to shifts in use and meaning of household settings from day to night within the Middle Chamelecón region of NW Honduras. In particular, building designs and uses of interior and exterior spaces are examined for their similarities

and variations within and between different sized households. The importance of private and public spaces, socializing and utilitarian spaces, and the architectural adaptation of these over time will be explored as their practical and communal significance transitions once daylight fades. Adding the element of natural changes of illumination to what have mostly been interpretations of daytime household activity, further highlights the complexity of these social spheres of daily life and the challenges of interpreting the entanglement of the sacred and secular, as well as the mundane and extraordinary practices they comprised.

Schwarz, Kevin (ASC Group, Inc.)

[67] *Discussant*

Schwitalla, Al [286] see Jones, Terry

Scott, Amy (University of New Brunswick) and Matthew Collins (University of York)

[96] *From Biochemistry to Bone: Exploring the Stress Response in Archaeological Skeletal Remains*

Bone is the foundation of the human body. In an archaeological context, the skeleton is the primary piece of evidence with which to explore past peoples and cultures. Because the skeleton adapts and changes over the life course, bone acts as a record-keeper, capturing specific periods of skeletal disturbance that we are able to observe and interpret. While the research potential using skeletal remains seems limitless, the primary challenge is that changes associated with poor health take time to manifest in skeletal tissues, inherently limiting what we are visually able to assess in osteological remains. However, through the integration of innovative biochemical methods that can identify the earliest stages of skeletal disruption, it will be possible to pinpoint changes in health not yet visible in the bone. This research compares visible skeletal changes associated with stress to biochemical fluctuations in protein (osteocalcin) and steroid (cortisol) levels to assess if these elements preserve in ancient bone and their relationship to gross macroscopic changes. Combining the interpretive power of these two chemicals in a novel and innovative way will make it possible to track periods of stress from the moment of onset through to visible skeletal change, leading to new interpretive possibilities.

Scott, Ann (Terracon/University of Texas at Austin)

[68] *The Politics in Places: An Ethnographic Picture of Highland Maya Use of Caves and Other Landscape Voids in Guatemala*

Caves and other sacred landscape features such as clefts in rocks and mountain voids embody special powers controlled by earthen, spiritual entities. To the Highland Maya that power personified by the earth owner needs to be maintained, appeased, and managed, even on a daily basis. This maintenance comes in the form of elaborate ceremonies utilizing a number of special items deemed suitable for pleasing the ancient entities. Mayan ritual specialists or daykeepers, who perform the ceremonies, are leaders in handling not only communication with earth owners, but also in coping with the politics of that leadership whether from the potent powers in the sacred space or modern challenges from communities, religious groups, or tourism. Our ethnographic work will present a case study of contemporary Highland Maya use of sacred space, both below and above ground, and how daykeepers manage the challenges from competing powers within that space and their struggle to keep the balance of the universe despite pressures from outsiders. Insider pressures will also be explored, as use of these sacred spaces for "dark" side practices is contested by the "light" side practitioners. We detail a number of strategies invoked to curtail site pollution, both physical and spiritual.

[11] *Chair*

Scott, Ashley (University of North Texas), Barney Venables (University of North Texas) and Steve Wolverton (University of North Texas)

[96] *Protein Modification in Fermented and Cooked Horse Milk: Taphonomic Implications for Archaeological Chemistry*

Archaeological chemistry continues to expand by adopting taphonomic experimentation as a means to identify the effects of particular processes and conditions on the preservation of biomolecular remains. Analysis of ancient proteins through mass-spectrometry based proteomics requires that archaeological chemists observe and record protein modifications that occur related to processing and use behaviors. We conducted cooking and fermentation experiments using horse milk; we then assessed protein modifications in comparison to fresh horse milk. Such taphonomic studies are essential for developing rigorous targeted approaches in archaeological chemistry.

Scott, Catherine (Boston University)

[151] *A Comparison of Elemental Analysis Methods for Sediment Geochemistry*

This poster will present preliminary interpretations from a study comparing different techniques of elemental analysis for sediment geochemistry, the goal of which is to determine the "best" technique to answer the questions at hand. "Sediment geochemistry" here refers to the collection of sediment samples and the elemental analysis of these samples in order to map activity areas across archaeological sites. This study used sediment samples collected from a modern, abandoned village called Eski Haciveliler, located in the Marmara Lake Basin in Western Anatolia. The elemental composition of the samples was measured using three techniques—loose powder X-ray fluorescence, glass bead X-ray fluorescence, and inductively coupled plasma mass spectrometry—to determine which technique represents the ideal balance between sensitivity of analysis and the cost/labor of analysis. In addition, this poster will be presented as one part of a larger study of multiple sites in the Marmara Lake Basin, both modern and ancient. The poster will briefly cover both field and laboratory methods, as well as preliminary results and interpretations.

Scott, Lindsay (Department of Anthropology, University of Montana, Missoula MT), Anna Marie Prentiss (Department of Anthropology, University of Mon) and Matt Walsh (Department of Bioscience—Arctic Research Center)

[50] *Borrowing and Inheritance: Testing Cultural Transmission Hypotheses in the Bridge River Housepit Village*

Cultural transmission is an evolutionary process that involves the transfer of information between people that over time can lead to the establishment of cultural traditions. This approach permits development of hypotheses regarding the cultural evolutionary process in a variety of contexts. In this paper we examine cultural transmission between generations by analyzing the effects of vertical and horizontal inheritance using archaeological data from the Bridge River housepit village. The Bridge River site offers a unique opportunity to examine cultural inheritance across generations spanning the past 2,000 years. In this paper, we present the results of a phylogenetic study of projectile points drawn from the deeply stratified floor sequence of Housepit 54 at Bridge River. This permits us to assess variability in cultural inheritance between the many floors and potentially also between housepits.

Scott, Paula [105] see Garraty, Christopher

Scott, Rachel (DePaul University)

[31] *Exploring Intersectionality through Osteobiography: A Case Study from Early Medieval Ireland*

Over the last decade, social identity has become well established as an area of bioarchaeological research. Although bioarchaeologists now examine a variety of identities in past societies (such as gender, age, and disability), it remains challenging to discuss the ways in which multiple identities intersect in the creation of individual lives. The construction of osteobiographies provides a means of investigating these intersections, in particular the interrelation of age with other aspects of social identity. Telling the life stories of individuals allows researchers to consider how aspects of identity affected the individual's pathway through life, as well as whether the salience of particular identities changed over the life course. To demonstrate the value of osteobiography for exploring intersectionality in the past, this paper focuses on a case study drawn from the early medieval period in Ireland (c. AD 400–1200). The analysis integrates multiple lines of evidence, interweaving human skeletal, archaeological, and historical data, in order to reconstruct possible pathways through life. The resulting narrative highlights the interrelation of age, gender, status, and religion in the lives of the early Irish.

Scott Cummings, Linda (PaleoResearch Institute, Inc.), R. A. Varney (PaleoResearch Institute, Inc.) and Peter Kovacik (PaleoResearch Institute, Inc.)

[174] *Ritual Smoking: Evidence from Archaeological Smoking Pipes*

Answering the question of what was smoked in prehistoric pipes benefits from a multi-proxy approach. Partially charred residue (dottle) provides more answers than does the black carbon that often lines the interior of archaeological pipes. Pipes examined from the American Southwest and Great Basin attest to use of a variety of plants, sometimes including ground maize, as smoking mixtures. Remains within the partially burned dottle are identified by pollen, phytolith, starch, macrofloral, and anthracological studies and also chemical (FTIR) signatures, then are compared with historic documents that indicate use of specific mixtures of plants in smoking pipes. Mixtures are documented to have included soft- and hardwood charcoal, conifer needles and lignin, tobacco, grass seeds, and/or maize (pollen or starch). The archaeological record suggests differences across cultural groups and through time.

[275] *Discussant*

Scott Cummings, Linda [229] see Banks, Kimball

Scott Cummings, Linda [191] see Milligan, Jennifer

Scotti, Victoria [300] see Bender, Morgan

Scott-Ireton, Della (Florida Public Archaeology Network) and Nicole Grinnan (Florida Public Archaeology Network)

[43] *Diving into the PAST: Public Engagement with Florida's Historic Shipwrecks*

Florida's historic shipwrecks are a natural draw for divers from all over the United States and the world. Many are located in warm, clear water, and all are home to an amazing variety of aquatic life. Capitalizing on the popularity of shipwrecks with sport divers, the Florida Bureau of Archaeological Research developed the Florida Underwater Archaeological Preserve program of interpreting historic shipwrecks for divers and snorkelers. Now numbering twelve shipwrecks, these "museums in the sea" have proven popular heritage tourism destinations, and effective vehicles for promoting the preservation of submerged cultural sites. Recently, the Florida Public Archaeology Network developed the PAST (Public Archaeological Shipwreck Tours) diving program to add another layer to historic shipwreck visitation and preservation. Focusing on the Preserves and other significant historic shipwrecks, the PAST program incorporates a presentation on the shipwreck to better describe its history and archaeology, and then an archaeologist-led tour of the site. Reflections on this program include a discussion of the successes of initial PAST events, participant feedback, and plans for the future to enable more divers to "Dive into the PAST!"

Seager-Boss, Fran [194] see Wells, Joanna

Sealy, Judith [30] see Pfeiffer, Susan

Searcey, Nicole [143] see Reinhard, Karl

Searcy, Michael (Brigham Young University), Todd Pitezel (Arizona State Museum/University of Arizona) and Eric Christiansen (Brigham Young University)

[237] *Sourcing Basalt from the Santiago Quarry in Chihuahua, Mexico Using XRF*

During survey in 2013, we identified the only known vesicular basalt quarry in the Casas Grandes region in northwestern Chihuahua, Mexico. Using XRF, we analyzed basalt from the Santiago Quarry and compared the results to the chemical characterization of formal tools (mostly mano and metate fragments) recovered at the site of Paquimé in order to determine if this quarry was one of the sources exploited by prehistoric stoneworkers during the Medio period (AD 1200–1450).

Sears, Erin (University of Kentucky/Smithsonian Institution)

[320] *You're Not from Around Here, Are You? Ceramic Figurines and Interregional Interaction in the Tres Zapotes Region*

The multiyear study of the ceramic figurines of Tres Zapotes recovered from archaeological explorations at the site center and the surrounding area indicate patterns of interactions throughout the development of the region. Supplemental museum specimens from past excavations at Tres Zapotes, residing in the National Museum of Natural History of the Smithsonian Institution, were also incorporated into laboratory analysis. The data are examined for evidence of exchange with other communities, particularly in central and southern Veracruz, the Teotihuacán core area, and the Maya region. While the Drucker and Weiant classificatory descriptive systems are still useful, they fail to capture some technological and aesthetic features reflective of interregional interaction. The aggregation of figurine material permits new interpretations of how the ancient Tres Zapotes community related to others through time.

Sebastian Dring, Katherine (Eastern Pequot Tribal Nation), Stephen Silliman (University of Massachusetts Boston), Natasha Gambrell (Eastern Pequot Tribal Nation) and Ralph Sebastian Sidberry (Eastern Pequot Tribal Nation)

[141] *Grounding Futures in Pasts: Eastern Pequot Community Archaeology in Connecticut*

Collaborations between archaeologists and Native communities have expanded significantly in the past 20 years. For most, this is recognized as an important and healthy development on methodological, theoretical, practical, and political grounds, especially when anchored deeply in the communities themselves and designed to address political as well as professional issues. We have worked together in different capacities for more than 13 years on the Eastern Pequot Archaeological Field School, a joint venture between the Eastern Pequot Tribal Nation and the University of Massachusetts Boston, to find ways to better orient archaeology to contemporary heritage and political concerns, community participation across generations, land management, and historical and cultural preservation. This effort has involved an equal emphasis on both process and product; careful attention to the linking of methods and materials with local knowledge and social memory; and a comparative and ever-changing perspective on the potentials and pitfalls of collaborative practice.

Sebastian Sidberry, Ralph [141] see Sebastian Dring, Katherine

Sebire, Matilda [379] see van Gijn, Annelou

Sedig, Jakob (Harvard University)

[287] *Improving Radiocarbon Dating with Ancient DNA Analysis*

Recent advances in ancient DNA (aDNA) analysis have helped to shed new light on long-standing archaeological questions. Researchers can now study how elites and commoners may have been genetically related, the genetic heritage of the first migrants to a particular area, how ancient populations are related to modern groups, and more. While such revelations have been of critical importance to archaeology, results from recent analyses have implicated that ancient DNA analyses can also be applied to methodological issues in archaeology. In particular, by identifying the relatedness of two or more individuals, aDNA analyses can sometimes be used to improve the dating of specimens and/or sites. This paper discusses recent aDNA research that has identified multiple sets of ancient individuals who are first-degree relatives (parent-offspring or siblings), but have a difference of 100 years or more in radiocarbon age ranges. These case studies are then used to examine how aDNA analysis can be used in to supplement radiocarbon dating in three particular ways: by identifying the need for the re-dating of samples; to help tighten the radiocarbon age ranges for individuals and sites; and possibly help calibrate the radiocarbon curve.

Seeman, Mark (Kent State University), Kevin Nolan (Ball State University) and Mark Hill (Ball State University)

[4] *Shifting the Interpretation of Ohio Hopewell Copper Use*

The dramatic uses of copper by Ohio Hopewell social networks have been studied for over one hundred years and have resulted in a diversity of archaeological perspectives. Our recent physiochemical study of particular Hopewell artifact classes is the most extensive to date and has resulted in source identifications that require that extant models be revised in light of our findings. Particular attention will be given to the implications that: 1) a diversity of Lake Superior outcrops were utilized; 2) the use of sources along the "Mica Road" to the southern Appalachians has been demonstrated for the first time; and 3) that copper source usage clearly differed from other recently sourced exotic Ohio Hopewell materials, notably silver and pipestone.

Seeman, Mark [4] see Nolan, Kevin

Seetah, Krish (Stanford University)

[285] *Empire, Environment, and Disease: An Indian Ocean Case Study.*

Between 1855 and 1859, the island of Mauritius, with a landmass of only 2040 km², was producing 10% of the world's sugar: a staggering testimony to the power of imperial influence on ecology. The transformations that this intensification in cane production resulted in were far reaching. One facet that remains poorly understood is the context of disease, despite a well-developed historical narrative. This paper presents details of a series of malaria epidemics that plagued the island from the 1850s onward. In 1867, some 41,000 people died from malaria, 10% of the entire population at that time. This massive death toll made the island of particular interest to the medical profession; notably, Roland Ross undertook his first major field research on Mauritius following his seminal discovery of the nature of malaria transmission. The presentation concentrates on the imperial response to malaria. It also discussed how archaeology is contributing to a clearer understanding of the historic context, and potentially, may have utility for contemporary studies of vector-borne disease.

[348] *Discussant*

Segura Llanos, Rafael

[170] *Dinámicas medioambientales, infraestructura de almacenamiento y paisaje agrario en Cajamarquilla (Siglos VII–IX dC)*

Cajamarquilla es uno de los centros urbanos preincas más grandes de la costa peruana (160 ha). Localizado en el valle del Rímac, el sitio fue uno de los centros dominantes de la cultura Lima entre los siglos VII y IX dC. Si bien otros grandes centros Lima coexistieron durante esta época, solo Cajamarquilla se localiza tierra adentro y en un entorno geológico altamente inestable al pie de la cordillera andina. Ya que este fue un periodo caracterizado por notables alteraciones medioambientales, nos preguntamos si el surgimiento y/o desarrollo del sitio representa una adecuación a tales condiciones extraordinarias. En este sentido, nuestras investigaciones revelan que Cajamarquilla exhibe un inusual y poco conocido sistema de almacenamiento, construido rápidamente y a una escala sin precedentes a partir del siglo VII dC. Ya que los cambios medioambientales suelen tener impacto directo sobre la subsistencia de los grupos humanos, nosotros exploramos los posibles vínculos entre dichos cambios, la expansión de la frontera agrícola mediante la construcción de un sistema integrado de canales de irrigación y el sistema de almacenaje de alimentos. Nuestro estudio genera nuevos datos que ayudan a entender las conexiones entre procesos urbanos y medioambientales, un tópico intensamente debatido en arqueología andina.

Seifried, Rebecca (University of Chicago)

[136] *Vestigial Religion: The Legacy of Byzantine Christianity in Ottoman and Venetian Greece*

This paper offers a glimpse into the roles played by religion during the decline of one empire and the emergence of another, from the perspective of a historical case study: the Mani Peninsula. Mani is a peripheral region in the Peloponnese, Greece, that converted to Orthodox Christianity under the Byzantine Empire, and its occupants maintained this religious identification throughout the subsequent periods of Ottoman and Venetian rule. This unbroken religious continuity, which can be traced in both the archaeological and historical records, can help us to understand the perseverance of a state religion even after its collapse, particularly in marginal and rural landscapes. The paper begins with a review of previous research on the Byzantine churches in Mani and offers new interpretations as to how religion functioned in the everyday lives of the rural population. Data are presented from recent fieldwork in the region, detailing what happened to the churches following Byzantine collapse, and in particular how they functioned in relation to

the people living in nearby communities. Finally, the paper explores the contentious relationship between local residents and the emerging Ottoman Empire and suggests that Orthodoxy was a key element in undermining the new state's power in the region.

Seifried, Rebecca [29] see Parkinson, William

Seki, Yuji [238] see Uzawa, Kazuhiro

Seligson, Ken (University of Southern California), George J. Bey (Millsaps College), Betsy Kohut (Millsaps College) and Tomás Gallareta Negrón (Instituto Nacional de Antropología e Historia)

[101] *The View from Above: The Semi-Autonomous Elite Maya Hilltop Complex of Escalera al Cielo*

Escalera al Cielo (EaC) is a Terminal Classic Period Maya elite hilltop complex located 1.5 km to the west of the site of Kiuc in the Puuc Region of the Northern Lowlands. Previous research on the hilltop focused largely on investigating the organization and day-to-day activities associated with the northern residential architectural group. The southern group, located atop the highest spur of the hill and consisting of four vaulted masonry structures accessed by a grand staircase, was believed to be the civic-ceremonial center of the complex. Excavation data from the 2008 and 2016 field seasons suggest that the southern group served a residential function in addition to a civic-ceremonial one. The presence of at least two distinct residential areas with vaulted architecture atop EaC suggests the presence of multiple elite families. The impressive architecture of these landholding families, their reverence for a distinct patron god combined with other factors suggest that the residents of EaC maintained a degree of semi-autonomy from the political center of Kiuc. This paper presents findings from the 2016 excavations in combination with preliminary excavations from 2008 to discuss the implications of semi-autonomous elite groups for the sociopolitical and economic organization the Terminal Classic Kiuc polity.

Sellen, Adam (Universidad Nacional Autónoma de México)

[310] *Ancient Zapotec Material Culture and the Antiquities Market*

While the growth of the Internet market in precolumbian antiquities is of great concern to the countries of origin and law enforcement, we should also recognize that the Internet is a crucial tool in the fight to protect cultural materials. In particular, online databases that were once created for purely scholarly purposes, can be effectively used to track stolen, lost or exchanged artifacts. This talk will focus on my own experience, for over a decade now, of managing a database that catalogues Zapotec urns, a coveted ceramic object among museums and collectors. From this vantage point I hope to expose the double-edged sword located between the scholarly pursuit of knowledge and the requirements of the art market.

[288] *Discussant*

Seltzer, Heather (University of Colorado Boulder)

[390] *Awanyus, Kachinas, and Birds, Oh My: Exploring Changes in Iconography in the Contact Era Rio Grande Pueblo World*

The Spanish conquistadors and missionaries created upheaval in the Pueblo world and increased interaction with external groups upon their arrival in the Rio Grande area during the sixteenth century. The social tensions that were exacerbated forced a blending of ideas and culture. Important concepts to the Pueblo people were often displayed through ceramic iconography. Whether the transference of ideologies exists in ceramic iconography becomes a focal question. Archaeologists have suggested that there was a revitalization movement intentionally brought on by the Pueblo people in order to remove the teachings of Christianity and reinforce traditional Puebloan ideology. This paper examines Puebloan iconography on pottery in the Upper Rio Grande Valley and compares it to other adjacent areas from the Pueblo III to Pueblo V Period. The varying levels of missionization and incorporation experienced by these groups is tested for corresponding presence.

Semken, Holmes [342] see Doershuk, John

Semon, Anna (University of North Carolina)

[377] *Examining Small-Scale Variations within Late Mississippian Complicated Stamped Pottery from St. Catherines Island, Georgia*

Late Mississippian (AD 1300–1580) ceramic typologies on the Georgia coast broadly group pottery based on 1) temper (coarse grit) and 2) surface decoration (incising, stamping, and rim decoration). Recently, Late Archaic and Mission period pottery studies focused on small-scale ceramic variations, which reflect micro-styles, were successful in identifying patterns related to past pottery communities of practice. Using a similar approach, I present data on three Late Mississippian village ceramic assemblages recovered from St. Catherines Island, GA. In this presentation, I focus on Irene Complicated Stamped wares as a case study and characterize the small-scale variations in temper, paste, and design motif from each site. In addition, I compare patterns between sites and explore various pottery communities of practice. More broadly, these data contribute to our understanding of Late Mississippian pottery practices and social interactions along the Georgia coast, on the cusp of European contact.

Semon, Anna [365] see Blaber, Thomas

Sender, Rachel, Daniel Peart (Ohio State University), Hannah Keller and Naomi Cleghorn (University of Texas at Arlington)

[152] *Ostrich Eggshell Taphonomy and Distribution at Knysna Eastern Heads Cave 1*

Analysis of ostrich eggshell (OES) fragment distribution at Knysna Eastern Heads Cave 1 (KEH-1) revealed taphonomic patterns. The variation of OES features and its distribution indicates that the OES was being used and processed differently in temporal and spatial context. KEH-1, a cave on the southern coast of South Africa, was inhabited by early modern humans throughout the Middle and Late Stone Age. Hearth features are prevalent throughout the sequence, providing evidence of occupational intensity and material processing. The abundance of OES found at KEH-1 allows a comprehensive analysis of OES modification and distribution. OES found at KEH-1 was coded according to color, texture, size, and whether or not it had been burned. The observed features of the OES, along with the stratigraphic context, was then used to interpret distribution patterns, which indicate that human exploitation of OES changed throughout the late Pleistocene. Analysis of the distribution indicates a correlation between the variation of features with hearths and stratigraphic aggregates. Early humans at KEH-1 left distinct taphonomic indicators on the fragments of OES left behind after processing. Further experimental taphonomic research may allow more detailed conclusions about the variation in human exploitation of ostrich eggs in South African prehistory.

Seowtewa, Octavius [34] see Hopkins, Maren

Sepúlveda, Marcela, Luis Cornejo (Universidad Alberto Hurtado), Thibault Saintenoy (CIHDE- CONICYT), Daniela Osorio (University College of London) and Luca Sitzia (Universidad de Tarapacá)

[134] *North/South Archaic Mobility in Dry Puna: Hunter-Gatherers from Upper Azapa Valley Basin, Northern Chile*

The different models of hunter-gatherer mobility in South Central Andean area, despite its theoretical and conceptual factors, normally emphasize for the Archaic Period the complementarity between vegetation belt for various biotic resources, depending on availability, location and seasonality. Here we complement such models at a meso-scale level, based upon results from surveys and excavations in upper Azapa valley basin, a region located at the foothills of the Northern Chile Cordillera. Our dataset includes open-air and rockshelter sites and the chronological attributions are based on relative and absolute dating. The characterization of site's function and the analysis of raw materials allows us to precise a north/south mobility, between the Peruvian southern highlands and Chilean northern ones, between 2,500 and 4,000 m above sea level. Without excluding direct mobility of these groups to the high Puna to the east or to the Pacific coast to the west, or the acquisition via exchange of raw materials and products of foreign origin, we argue that settlement patterns between ~ 9500–1500 years BP, would correspond to a greater territorial reach over time associated to a significant rock art practice.

Sepúlveda, Marcela [216] see Ballester, Benjamín

Sereno-Uribe, Juan

[7] *Excavation and Architecture of Gualupita Morelos*

Archaeology is the way to understand our most ancient past. Through the study of material remains, we can understand how people from one civilization or another lived. Materials are the object of study for the archaeologist; in the working places of archaeologists, it is common to find a lot of pottery shreds, lithic objects, clay figurines, and more artifacts that speak about the past. In this poster, we are going to talk about an object, one that it is so important that no other objects would have any relevance if we didn't consider it. We are talking about architecture. Before creating any objects, man create the space where they are going to be used, and that space is limited by surrounding walls; in this sense, we understand the architecture as the creations of volume to manipulate the space. Man develops all activities around the spaces provided by the architecture, and there is where we found many of the objects that we later analyze in the laboratory. In the actual poster, I will explain the excavations techniques that we used at Gualupita Morelos, a Preclassic site, and the information recovered from a household.

Serra Puche, Mari Carmen (IIA-UNAM)

[215] *La producción de artesanías durante el formativo en Xochitecatl-Cacaxtla, Tlaxcala*

En las exploraciones arqueológicas realizadas en las terrazas de Xochitecatl-Cacaxtla se han localizado varias unidades habitacionales donde se producían diferentes bienes de consumo y de prestigio, entre las que destacan: la cerámica, la obsidiana, las cuentas de jade, la lítica pulida y el mezcal, entre otros. Se han localizado áreas de actividad y talleres con las evidencias arqueológicas de manufactura e incluso de almacenamiento. Analizaremos la producción de estos bienes, su distribución local y regional con el fin de entender las posibles estrategias políticas que se ven reflejadas entre productores y consumidores.

Serra Puche, Mari Carmen [88] see Vicencio, A. Gabriel

Sevastakis, Ekaterina [244] see Belmaker, Miriam

Sever, Thomas [131] see Saturno, William

Seyler, Samantha (University of Pennsylvania)

[75] *Liturgical Textiles from the Spanish Colonial Reducción of Santa Cruz de Tuti, Colca Valley, Peru*

A highly visible symbol within the church, liturgical cloth plays an important role in the communication of ideas about the wealth and authority of the Catholic Church. During the colonial period in the Andes, the influence of liturgical textiles extended to reinforcing ideas about the power of the Spanish Empire as well as the role of indigenous populations within it. Although cloth production during the period of Spanish colonization is a subject discussed to some extent by art historians looking to better understand the garments and tapestries found in museums and churches across the Andes today, very little research has been conducted on colonial textiles recovered from archaeological contexts. This paper presents a discussion of textiles recovered in situ from the sacristy of the colonial reducción of Santa Cruz de Tuti, located in the Colca Valley, Peru. In particular, I present a preliminary structural and stylistic analysis of the archaeological specimens, and compare them to the liturgical textiles of the sacristy in the descendent community of modern Tuti.

Seyler, Samantha [75] see Berquist, Stephen

Sezate, Adam

[303] *Prehistoric Pipe Replication and Analysis: A Deeper Look into the Bowl*

Smoking pipes have played an integral role for many American Southwestern groups. My research project conducts a thorough investigation into the construction of prehistoric ceramic and stone pipes. Using only stone tools, I conduct construction and use-wear analysis on the tools used to create pipes as well as the pipes themselves. I analyze the two materials most used among Southwestern Native American groups, local Southwestern clay (from the Tucson Basin) and vesicular basalt. Measuring the time spent using different techniques such as drilling, pecking, grinding, and clay shaping I investigate the most efficient methods for producing stone and ceramic pipes. Analyzing tool use wear also provides insights into different wear patterns from different techniques. This research helps us understand the efforts prehistoric groups took to create objects of spiritual importance and aids in the understanding of their construction.

Sgarlata, Cosimo (Western Connecticut State University)

[336] *Python Scripting and Archaeological Applications Using ArcGIS*

When ArcGIS software enabled Python computer scripting language as a platform whereby users can automate tasks, edit and create new programs; it opened a door for archaeologists to enhance much of the work they do mapping, and performing spatial analysis. This session looks at the utilization of

Python scripting language for automating a number of tasks which archaeologists do routinely, as well as other open-source software and how its applications can lend new dimensions to the way we analyze space and record archaeological information in general.

Shaffer Foster, Jennifer (Medaille College)

[212] *Ritual and Rag Trees in Contemporary Ireland*

In Celtic countries, early Christianity was syncretized with preexisting religious beliefs and rituals, some of which were maintained and modified through the centuries, while others were subsequently adopted but understood as ancient or essential. One ritual practice inhabiting the border of Christian and non-Christian tradition is seen in the Irish rag tree, a hawthorn with strips of cloth hanging from the branches, often located at holy wells or other Early Medieval ecclesiastical sites. People burdened with ailments, or worried about those of their loved ones, tied a bit of cloth to the tree, said a prayer, and believed that when the rag disintegrated so too would the affliction. This practice may be no older than the nineteenth century, but the association of supernatural powers with trees in Ireland dates to the pre-Christian era. Although the practice had been waning, rag trees are currently experiencing a resurgence as manifestations of diverse and fluid belief systems. Rag trees are prominent at numerous archaeological, historical, and natural sites and are understood in different ways by Christians, neo-pagans, Irish Travelers, and foreign tourists, necessitating a complicated and nuanced academic understanding of this practice and the motivations of those who engage in it.

Shaheen-McConnell, Theo

[246] *Crystal Creek Water Ditch: From Past to Present and Future*

The Crystal Creek Water Ditch, located within Whiskeytown National Recreation Area (NRA) west of Redding, California was built between 1852 and 1859 for the purposes of gold mining and conveying water to the nearby Tower House Hotel that was situated along the historic travel corridor between Shasta and Weaverville during the California Gold Rush. The ditch provided water for the hotel gardens, orchards, and for small-scale gold mining along the creeks. The ditch consists of two sections which total 2.5 miles and include headworks, crossovers, retaining walls, wooden gates, as well as a levy, silt trap, overflow float, power generator, clean-out shed, inverted siphon, storage tank, and down drain. The levy has been continuously utilized as a trail, first by the ditch tenders and later as a hiking trail by the National Park Service. Most components are still present and were working until 2013 when an unanticipated water release damaged large sections of the lower portion of the ditch. This has provided an opportunity to fortify the ditch and rehabilitate deteriorating constituents using period-appropriate construction techniques for increased interpretation and visitor use opportunities.

Shakour, Katherine (University of South Florida) and Ian Kuijt (University of Notre Dame)

[141] *Going beyond Science: The Tangible and Intangible Contributions of Community Archaeology*

It is widely recognized that archaeologists have the potential to contribute in meaningful ways to local communities. However, it is also important to consider the tangible and intangible nature of these contributions given the diverse and, sometimes, competing interests among various stakeholder groups along with the seasonal nature of academic archaeological and heritage research. Multiyear collaborative projects often facilitate greater general awareness of local heritage, open new opportunities for heritage tourism, and contribute toward reflections of local, regional and national identities. In this presentation, we draw examples from nine years of the Cultural Landscapes of the Irish Coast (CLIC) project, centered on the islands of Inishark and Inishbofin, off the west coast of Ireland, to examine how archaeological projects (broadly defined) contribute in tangible and intangible ways to heritage construction, island identity, and a sense of value and importance of local history and archaeology.

Shanahan, Kelley [37] see Perlingieri, Cinzia

Shantry, Kate (ERCI)

[47] *Burned Earth without Cooking Stones: Cultural or Natural? Feature Deposition, Ethnobotany, and Analysis in Upland Puget Sound, Western Washington*

Concentrations of burned earth, cooking stones, a shallow basin profile, and sometimes faunal remains are often associated with Puget Sound hearth features which were commonly used for open-air cooking. Discrete areas of burned earth lacking concentrations of cooking stones have not received as much cultural feature recognition or interpretation. This poster explores the function of one in situ concentration of charcoal adjacent to a dense area of cooking stones at an upland camp in the Puget Sound basin of northwest North America to determine one of three scenarios. Is this feature a steaming pit in two parts, a dismantled pavement with a primary and secondary context, or a naturally burned tree near a secondary deposit of cooking stones? Deposition, ethnobotany, and feature analysis are used to examine the function of Feature 1 at 45K1176.

Sharapov, Denis (University of Pittsburgh)

[221] *Early Politics in the Steppes: Sintashta Communities of Southern Russia*

First polities in the Eurasian steppes are documented by the Greek and Chinese historical accounts of the Scythians (ninth–third centuries BC) and the Xiongnu (third century BC–first century AD). Archaeologically, these entities manifested themselves in complex settlement networks, consisting of fortified sites, dispersed farmsteads, and mobile pastoral camps. Earlier roots of political organization in the Eurasian steppes are largely limited to funerary and ceremonial monuments, which presumably served as aggregation points for dispersed populations. In this context, more than twenty Middle Bronze Age (MBA) (2100–1700 BC) nucleated fortified settlements, concentrated in the Southern Ural steppes of Russia, commanded particular attention of archaeologists. Given that integration of settlements at a supra-local scale has been considered a hallmark in the emergence of complex societies, the isolated and completely centralized nature of MBA sites precluded viewing them as centers of early polities. However, a recent systematic regional survey recovered diagnostic MBA material from a number of unfortified settlements located some distance away from the fortified centers.

[221] *Chair*

Sharon, Gonen (Prehistory Laboratory, Tel Hai College), Maya Oron (Israel Antiquity Authority), Rebecca Biton (Hebrew University of Jerusalem), Rivka Rabinovich (Hebrew University of Jerusalem) and Steffen Mischke (University of Iceland)

[389] *A Week in the Life of the Mousterian Cows Hunter: A Mousterian Hunting Location on the Banks of the Paleo-Hula Lake*

Eight excavation seasons (2007–2014) at the Mousterian site of Nahal Mahanyem Outlet (NMO) on the banks of the Upper Jordan River offer a glimpse into the lifeways of MP people during a hunting expedition in the Upper Galilee. This open-air site, OSL dated to ca. 60ky BP, is interpreted as recording a series of short-term hunting events. The NMO horizons, with their small number of lithic artifacts, unique typological composition and evidence for task specific hunting and butchering activity fit within Binford's (1980) definition of a "task location." The NMO findings include excellently preserved organic material, including animal bones, both micro and macro-fauna and botanic remains. We have now acquired information and data that enable us to suggest models that reconstruct the nature of the site and human behavior reflected in its layers and finds. Issues of cognitive abilities, hunting praxis and subsistence strategies, site function and group mobility all are in need of new, high resolution data that NMO can provide.

Moreover, the high resolution stratigraphy and, above all, the excellent preservation of botanic and pollen remains can achieve a comprehensive picture of the Late Pleistocene environment and its impact on human diet, subsistence and survival.

Sharp, Emily (Arizona State University) and Rebecca E. Bria (Vanderbilt University)

[222] *Ritual Violence or Simply Ritual? Evaluating the Evidence for Child Sacrifice in Late Formative Period Peru*

Highland mortuary practices during the Andean Late Formative Period (900–500 BC) in Ancash, Peru are poorly understood, in part because burials from this period are rarely encountered. Excavations conducted in 2009 at the archaeological site of Hualcayán uncovered a primary interment of a juvenile aged 5–6 years at time of death, dated in the range 806–540 cal BC. The individual was buried with a necklace strung with bone and shell beads and bone spoons. Bioarchaeological analyses indicate the juvenile sustained possible perimortem trauma to the basicranium and the second cervical vertebra. A differential diagnosis of perimortem and postmortem trauma will be completed to evaluate this individual's status as a possible ritual sacrifice. Determining the etiology of these fractures, whether resulting from a violent act or more accidental behavior, is complex and requires knowledge of the burial context. Drawing on insights from forensic analyses of trauma and archaeoethnology, this paper will assess how taphonomic processes impact interpretations of skeletal fractures and the burial environment. It will subsequently explore how these issues affect the juvenile unearthed at Hualcayán. This relatively complete burial provides important insights into the treatment of children and their role in ritual activities during the Formative period in the north-central Andes.

Sharp, Kayeleigh (Southern Illinois University Carbondale) and Juan Martinez (Bruning Archaeological Museum)

[308] *Multi-crafting in Coexisting Gallinazo-Moche Contexts at Songoy-Cojal, North Coast, Peru*

Over the past few decades, it has been recognized that craft studies often overlook the social significance of crafts practiced concurrently. How does the selection of certain types of materials inform on the relationship between manufacturers and consumers? Does multi-crafting imply broader social relations? Or does multi-crafting imply locally meaningful social relationships through the various types of crafts produced? This paper explores the multi-craft traditions practiced in coexisting Gallinazo-Moche contexts at the Songoy-Cojal site in the mid-Zaña valley, North Coast, Peru. In this presumably multiethnic setting, evidence of pottery, stone, metalworking and metallurgical traditions are suggestive of complex social interrelationships that may help to define key aspects of social organization within the site and in the Lambayeque region more broadly. In particular, I explore the relationship between users and manufacturers of stylistically Gallinazo (or Virú) and Mochica artifacts, testing the hypothesis that this mid-sized center may have held a disproportionately high significance within the broader Lambayeque region.

[308] *Chair*

Sharp, Kayeleigh [175] see Wagner, Mark

Sharpe, Ashley (University of Florida)

[284] *Lead (Pb) Isotope Analysis as a Means of Tracking Animal Migration and Trade in Mesoamerica*

This study examines the first use of lead (Pb) isotope analysis as a means of tracking animal movement and exchange in the Maya area. Strontium and oxygen isotope ratios have been previously used to track animal and human movements archaeologically in Mesoamerica. Lead has been used to track movement and exchange in other parts of the world, and its application to Mesoamerican archaeology holds great potential for refining sourcing strategies. This study identifies local and nonlocal fauna at the Maya site of Ceibal, Guatemala, which has one of the longest occupational sequences of any Maya community (c. 1000 BC–AD 950), allowing for a long-term examination of animal use and exchange. Nonlocal animals identified at Ceibal are sourced to their potential place of origin using a new lead isotope baseline map for the Maya area. The study reviews the advantages of using the three lead isotope ratios (208, 207, 206Pb/204Pb) in conjunction with strontium (87Sr/86Sr) in Mesoamerica, and examines potential sources of error from modern lead pollution.

[284] *Chair*

Sharpe, Ashley [5] see Cunningham-Smith, Petra

Sharples, Niall (Cardiff University)

[133] *Contrasting Communities: Relationship Change in the Western Isles of Scotland*

The paper is an examination of the cultural differences that exist within the Western Isles and how these relate to similarities and differences with other areas of the North Atlantic, such as the Orkney and Shetland. It will focus on the changes that occur in the first and second millennium AD; the relationship with the Picts and Scots, the transformation brought about by the Vikings and the integration of the islands into the Kingdom of the Scots. These political changes can be compared and contrasted with changes in architecture and material culture that express a much more nuanced pattern of cultural transformation.

Sharratt, Nicola (Georgia State University)

[136] *Rejection and Reinvention: A Diachronic Perspective on Ritual and Collapse in the South Central Andes*

Scholarship on Tiwanaku (AD 600–1000) emphasizes the ceremonial nature of its capital city and the role of ritual practice in incorporating diverse groups as the state's influence expanded across the south central Andes. Although debate continues about its cause, recent research indicates that the Tiwanaku state's political collapse played out over several centuries. In this paper, I draw on data spanning that period of fragmentation to take a diachronic perspective on the ways in which ritual, which had been so tightly intertwined with state politics and elite authority, was impacted following collapse. Examining both community ceremonial activity and funerary rites I propose that, during the height of the Tiwanaku state, ritual practice played an important role in the shifting sociopolitical landscape brought about by collapse. In the short term (AD 1000–1250), many Tiwanaku rituals were maintained but subtle shifts in funerary rites and the resituating of collective ceremonies reveal how populations confronted intra and inter community tensions. I then examine the longer term rituals (post AD 1250), and explore why Tiwanaku collective ceremonial practice ultimately disappeared from the archaeological record, but elements of funerary ritual endured.

Sharratt, Nicola [233] see Lowman, Shannon

Shaw, Jennie (Salix Archaeological Services LLC)

[228] *Beyond Radiocarbon: Using AMS Samples to Assess Woody Plant Use at Tse-whit-zen*

Paleoethnobotany, while not a nascent field, is still an underutilized research framework in Pacific Northwest (PNW) archaeology. But increasingly, PNW projects have incorporated macrobotanical analyses as a precursor to radiocarbon dating. Analysts provide taxonomic identifications of woody fuel remains and assist in selecting fragments from short-lived genera that will mitigate the old wood effect, thereby increasing the accuracy of dates. This paper assesses the utility of an anthracological study of over 400 charred wood fragments from the Tse-whit-zen site, a large coastal village in northwest Washington State. At least 15 genera of trees and shrubs were burned at Tse-whit-zen, including plants traditionally harvested for foods, fuels, medicines, and tools. Radiocarbon "pre-analyses" such as this one offer a convenient opportunity to access botanical knowledge at a smaller scale than grand paleoethnobotanical research initiatives and, with appropriate caveats, can contribute to the greater understanding of local fuel selection, household activities, and plant management practices.

Shaw, Justine (College of the Redwoods)

[67] Moderator

[67] Discussant

Shaw, Ryan [227] see Rabinowitz, Adam

Sheets, Payson (University of Colorado)

[80] *Darkness at Noon and a Whole Lot More: The Temazcal at Ceren*

When people entered the temazcal at Ceren and shut the door, they created utter darkness at any time during the day. Their preparations were elaborate, involving obtaining permission from members of Household 2, who had a service relationship in maintaining the structure. They provided pine firewood and water in ollas for creating steam and as well as for ablutions after partaking. Creation of a fire in the domed firebox heated and smoked up the interior; then a plug was removed from the roof to clear out the smoke. Next, water was poured over the firebox to create steam, and when all were inside, darkness rose as they shut the door. Copal was burned to access spirits, deities, or other supernaturals. Our usage of the 1:1 replica of the temazcal has been instrumental in revealing unanticipated consequences of the darkness: we were stunned with how the dome transformed our verbal communication. Whether words were spoken or sung, voices were greatly amplified and tones were significantly lowered. This soundscape must have played a major role in the supernatural powers invoked by participants. Interior size allows for at least a dozen people, indicating that the temazcal probably served various functions for different groups.

[148] Moderator

[148] Discussant

Shelach, Gideon (Hebrew University)

[26] *A reexamination of Bronze Age trans-Eurasian interactions*

Bronze artifacts from different parts of the Eurasian steppe zone have been used to argue for prehistoric interactions among the societies that lived in this region during the late second and early first millennia BCE. Indeed, similarities among such artifacts as knives and daggers with animal heads are telling. But what was the nature and intensity of such interactions and their effects on the local communities? In this paper I will address those questions by looking at specific well dated contexts and by correlating the bronze finds with data relevant to our understanding of the subsistent and political organization of the local societies in the eastern part of the Eurasian steppes.

Sheldrick, Nichole (University of Oxford)

[57] *Endangered Archaeology in Arid Lands: Remote Sensing and Heritage Management*

The Endangered Archaeology in the Middle East and North Africa Project (EAMENA) uses satellite imagery to record damage and threats to the heritage of the MENA region. We are recording these data in an open-access database to create a useful platform for the management and protection of heritage in these countries. A remote-sensing approach to heritage management has many advantages and is particularly effective in the arid MENA region due to limited vegetation and development. The availability of satellite imagery via platforms like Google Earth makes it possible to identify and monitor sites remotely in a swift and cost-effective manner. In addition, as a result of ongoing conflicts, it is increasingly difficult to gain access to many sites in the region, making remote sensing an ideal alternative. Using case studies from Egypt, Libya, and Saudi Arabia, I will present EAMENA's methodology and demonstrate its potential for heritage management in arid regions. Many sites in these regions are under threat from factors including development, mining, and agriculture. Although not all disturbances to sites in these regions can be prevented, by combining remote sensing with the work of local archaeologists, we can mitigate the effects of these problems in the future.

Shen, Chen (Royal Ontario Museum)

[78] Discussant

[78] Chair

Shen, Chen [78] see Zhang, Jian

Shennan, Stephen [216] see Edinborough, Kevan

Shepard, Ben A. (UCLA), Vladimir Ivanovich Bazaliiskii (Department of Archaeology and Ethnography, Irkutsk), Olga Goriunova (Department of Archaeology and Ethnography, Irkutsk), Michael Richards (Department of Anthropology, University of British) and Andrzej Weber (Department of Anthropology, University of Alberta)

[330] *A Geochemical Investigation of Sociopolitical Structure among Holocene Hunter-Gatherers in the Cis-Baikal's Little Sea Micro-Region*

We present the results of a large-scale comparative study of individual life histories among hunter-gatherer groups inhabiting the western coast of Lake Baikal (Russian Federation) during the Late Neolithic (5700–4900 cal BP) and Early Bronze Age (4900–3700 cal BP). More specifically, we employ data on stable strontium isotope ($^{87}\text{Sr}/^{86}\text{Sr}$) values from tooth enamel collected from human molars (M1-M3), along with associated data on variation in isotopes of carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) to provide a glimpse into individuals' long-term mobility practices and subsistence activities. Using these data in conjunction with archaeological data on grave goods and the placement of interments at cemeteries (single/multiple interments, grave rows, grave clusters), we suggest that the Late Neolithic-Early Bronze Age transition featured changes in group structure that are broadly consistent with a hypothesized decline in corporate political economic strategies during the Early Bronze Age.

Shepard, Lindsay, Christopher Schwartz (Arizona State University), Will Russell (Arizona State University), Robert Weiner (Haffenreffer Museum of Anthropology) and Ben Nelson (Arizona State University)

[23] *Blue-Green Stone Mosaics in the U.S. Southwest and Northwestern Mexico: Origins, Spatio-Temporal Distribution, and Potential Meanings*
Intricately-crafted mosaics are prevalent among blue-green stone artifacts created in prehispanic Mesoamerica, but are rarer in the prehistoric U.S. Southwest and northwestern Mexico (SW/NW). Because they occur earlier in Mesoamerica and are the most Mesoamerican-like of the SW/NW blue-green stone creations, we propose that the production and use of these artifacts in the SW/NW was derived from Mesoamerica. We describe the degree to which mosaics manufactured in the SW/NW resemble and differ from those crafted in Mesoamerica. Using examples from Chaco Canyon, the Mimbres region, and Paquimé, we discuss how the mosaics are revealing of Mesoamerican-like practices and adapted for use in distinctly SW/NW ways. Their rareness and this association with distant places imply high value and restricted access. Thus, mosaics seem likely to be associated with architecture of power. This distributional hypothesis is tested through analysis of the spatiotemporal distribution of blue-green stone mosaics in the Hohokam region. Finally, we discuss the implied uses and meanings of mosaics in the SW/NW based on both their depositional contexts in powerful ritual structures and ethnographic analogy. We propose that the mosaics, rich with ideological associations related to their blue-green color, embodied the concentration of ritual power derived from distant sources.

Shepetuk, Nicholas [8] see Woolwine, Lauren

Sheppard, Jonathan (Arrowstone Archaeological Research & Consulting Ltd.)

[343] *The Settlement Patterns of the Mid-Fraser Region of British Columbia: A Statistical Analysis of Housepit and Village Sizes*
This poster presents a settlement pattern analysis calculating the relative size distribution of housepit villages along the Mid-Fraser Region of British Columbia. The precontact settlements in this study area, along the Fraser River plateau between Yale and Big Bar, are among the largest hunter-gatherer communities anywhere in the world. While previous studies in the region have concentrated on the Keatley Creek, Bell, and Bridge River housepit village sites, the research presented in this poster greatly expands on these analyses by utilizing a sample size of over 1,000 housepits from 49 villages in the region. In addition, while previous studies on settlement sizes in the area have focused on either the number of housepits or the size of individual housepits—the research in this poster uses a calculation of total roof area as a means of analyzing both housepit and settlement size and their potential statistical size classes. Investigating discrepancies in housepit and settlement size classes can give insight into potential hierarchies among settlements and can be used to infer social stratification. This method, of using site size as an index of use for a settlement location, has previously been used in the American southwest to document social stratification.

Sheptak, Rus (University of California—Berkeley)

[395] *Hybrid Cultures: The Visibility of the European Invasion of Caribbean Honduras in the Sixteenth Century*
Archaeological excavations in Caribbean coast Honduras explored the site of Ticamaya, described in sixteenth-century Spanish documents as the seat of a leader of indigenous resistance. Yet despite testing confirmed deposits from the period covering initial conflict with the Spanish, roughly 1520–1536, these excavations produced no use of European goods until the late eighteenth century. Contemporary with Ticamaya, the site of Naco to the west hosted troops sent by Cortes, and at least one majolica vessel was discarded there. The contrast could lead to the conclusion that Ticamaya was unaffected by the Spanish encounter until it was conquered. In our presentation we offer an alternative: emphasizing the novel construction of defensive walls at Ticamaya and its allied sites as likely material traces of innovations mediated by Spanish knowledge mobilized for indigenous resistance by a shipwrecked sailor turned strategist against Spanish invasion. Our proposal seeks to blur apparently firm lines between native and foreign materialities and define a third option of hybrid cultures.

[64] *Discussant*

Sheridan, Alison (National Museums Scotland), Pierre Pétrequin (CNRS and Projet JADE) and Michel Errera (Projet JADE)

[23] *Green Treasures from the Magic Mountains: The Use of Jadeitite and Other Alpine Rocks in Neolithic Europe*
The results of a major, French-led international research program investigating the use of jadeitite and other Alpine rocks in Neolithic Europe—Project JADE and JADE2—are summarized. The significance of the green color of most of these rocks, and of the montane location of their sources, is discussed in terms of the belief systems of the people who made, exchanged, and used the ax- and adze-heads and disc-rings made of these materials. The ways in which these materials were recognized in prehistory are reviewed, and the life-histories of certain artifacts are described. Some case studies highlighting the way in which Alpine objects moved and were used are presented.

Sheumaker, Christian [83] see Levi, Laura

Shi, Yuli [78] see Ma, Xiao

Shillito, Lisa-Marie (Newcastle University)

[367] *Investigating the Nature and Timing of the Earliest Human Occupation of North America Using a Novel Integration of Biogeochemistry and Micromorphology*
Paisley Caves, Oregon, is one of the key sites in current debates surrounding the peopling of the Americas. Ancient DNA evidence for human occupation of the cave has been debated, and coprolites have been said to be visually dissimilar to human faeces. This has implications for how we understand early occupation and migration in this part of North America. Our project will contribute to this debate, using a novel integration of biogeochemistry and sediment microstratigraphy. The aim is to assess the taphonomy of fecal biomarkers within the cave sediments, alongside secure dating through compound specific 14C of lipid residues. By analyzing lipid biomarkers, this project will identify the species of a large collection of coprolites from the cave, as well as investigating the dietary evidence contained within them. Compound specific 14C will provide very precise dates for occupation, which can be linked with the dietary evidence to assess seasonality of occupation and resource use.

[229] *Discussant*

Shimada, Izumi (Southern Illinois University)

[323] *Nested-Context Perspective of Craft Production: Middle Sicán Metallurgy*
Different facets and stages of craft production commonly occur in different spatial loci regardless of differences in medium, technology, intensity and/or scale. Locational differences may be relatively minor with different facets or production stages being practiced concurrently, or masters and apprentices occupying different areas of a given room or workshop. While sheet metal preparation and alloying both require constant heat sources, the former

requires a clean area protected from winds and dust. Locational differences can also be major, involving different settlements as with the case of primary smelting and subsequent metalworking; the former being heavily influenced by natural/material factors and close to ore and fuel sources and reliable winds. The latter is much more dependent on social/human factors such as the nature of artisans involved and intended use and users of products. Accordingly, clarification of spatial dimensions of craft production requires what I call nested-context approach and an accompanying multi-scalar and dynamic, processual perspective. Based on data garnered over nearly four decades of holistic research on the Sicán metallurgy, this paper will illustrate how the approach and perspective can be applied for valuable understanding of the spatial dimensions of this complex craft.

[164] *Discussant*

Shimohama, Takako [138] see Yamamoto, Naoto

Shipton, Ceri [32] see Boivin, Nicole

Shiratori, Yuko (Graduate Center, CUNY) and Timothy Pugh (Queens College and The Graduate Center, CUNY)

[179] *Exemplary Centers as Quintessential Places: Migrants and Architectural Quotations in Late Postclassic Petén, Guatemala*

Exemplary centers are physically schematized archetypes which represent and communicate social realities and political orders. Such exemplary centers are quintessential places, as they represent identity and memory. Migrating populations frequently reconstruct exemplary centers that replicate homelands through materials and images demonstrating their identity. Such "architectural quotations" help the migrants to legitimate social and political positions in the new locations. Members of groups perform commemorative ceremonies to demonstrate social memories at the exemplary centers. In so doing, a sense of collective identity is reinforced through the past. The Late Postclassic (AD 1250–1525) Maya groups in Petén, Guatemala, claimed origins in Yucatán, Mexico, and constructed exemplary centers representing the great city of Mayapán, in Yucatán. This paper investigates exemplary centers in Petén through the examination of ceremonial architecture and associated materials and images. We argue that the Late Postclassic exemplary centers were constructed to legitimate social identities in Petén.

Shock, Myrtle (Universidade Federal do Oeste de Pará), Laura Furquim (Universidade de São Paulo), Jennifer Watling (Universidade de São Paulo) and Eduardo Neves (Universidade de São Paulo)

[62] *Extinct Mid-Holocene Maize from the Monte Castelo Shell Mound, Rondônia, Brazil*

In the Brazilian Amazon, mid-Holocene maize (*Zea mays*) grains have been found in archaeological deposits of the Monte Castelo shell mound. The morphological differences are pronounced between these and grains from both modern maize races of the Amazon and those found beginning around 1,500 years ago at other sites in the region. Our research explores the history, from 3900 BP, and use of this extinct maize. The presence of cultivars rich in carbohydrates in the Amazon has traditionally been interpreted in light of their potential caloric contribution to the diet and the economic implications of plant cultivation. Alternatively, we start from plant morphology and the cultural contexts, including burials, where these grains were deposited during mid-Holocene occupations. The shell mound, which dates from the early to late Holocene, contains a variety of edible plants and diverse faunal resources, of which maize is one element.

[363] *Discussant*

[62] *Chair*

Short, Laura (Texas A&M)

[173] *Further Studies in Raman Spectroscopy of Fire-Cracked Rock*

Biomolecular organic residue analysis is an increasingly popular avenue of archaeological investigation. It is most frequently performed on pottery, though other substrates such as groundstone and chipped lithics are common. Recently, these methods have extended to fire-cracked rock (FCR). FCR features such as earth ovens are an excellent potential application: a) botanical evidence is not always preserved in the features and b) cracks that form in the FCR during the cooking process may protect residues. Earth ovens, as cooking features with wide spatial and temporal distribution, are thus an important subsistence information source. This paper represents a starting point for using Raman spectroscopy to analyze biomolecular organic residues on FCR. Following best practices makes for more accurate subsistence data, which in turn means more accurate interpretations. This paper focuses on the construction of a reference collection for a project analyzing FCR from earth ovens in south-central North America. Modern and prehistoric raw plants were analyzed, as were plants cooked in the lab and actualistic experiments. These will demonstrate differences between the plants' chemical signatures, as well as effects of time and cooking on plant signatures. Selected FCR samples from said site will be interpreted in light of this reference collection.

Shott, Michael (University of Akron)

[150] *Moderator*

Shrestha, Ramesh (University of Houston/NCALM) and Juan C. Fernandez Diaz (University of Houston/NCALM)

[320] *Challenges and Opportunities to the Lidar Mapping of the Tres Zapotes Region*

The Olmec polity of Tres Zapotes, which developed on the southern gulf lowlands of the present day state of Veracruz in Mexico, is nestled between the Papaloapan river delta and the Tuxla Mountains. Topographic, geological, ecological and cultural context of the region presents unique challenges and opportunities to archaeological prospecting using airborne lidar mapping due to extensive cultivation of sugar cane which can hinder the capability of the lidar to map the ground beneath it; cultural features which are very similar to natural topographic features and in some cases are buried under several levels of alluvium. But these challenges present improvement opportunities to the lidar prospecting technique both in terms of hardware and data analysis developments. This presentation will cover lessons learned dealing with the challenges during a lidar survey project that was conducted in the region in 2014.

Shrestha, Ramesh [131] see Fernandez Diaz, Juan C.

Shugar, Aaron (Art Conservation Department)

[135] *Discussant*

Shultz, Daniel (McGill University)

[25] Computer Simulation of the Effect of Urban Centers on the Development of Wealth Inequality in Pastoral Nomadic Society

Agent-based computer simulation is an approach that models the behavior of individual agents, allowing for the observation of emergent phenomena created by the aggregate effects of individual actions. This presentation builds on a recent series of agent-based computer simulations exploring the development of wealth inequality as a function of environmental change in pastoral nomadic societies. When simulating a pure pastoral nomadic economy, it was found that wealth inequality increased under favorable environmental conditions. This presentation reports on the results of new simulations incorporating urban centers into this environment to examine their effect on the distribution of wealth. The relevance of these results for understanding the growth and stability of the Mongol empire will be discussed, with particular reference to historical sources dealing with the relationship between pastoral nomadic populations and urban centers.

Siegel, Peter E.**[384] The Cultural Kaleidoscope in the "Island of Guiana"**

The Guiana Shield is an island demarcated by the massive river systems of the Orinoco and Amazon and the northeast coastline of South America. Numerous Amerindian groups with distinct identities have occupied the region for thousands of years. In the contexts of maintaining distinct identities and active processes of ethnogenesis, well-established webs of relations and exchange exist across the region. Relations of production and distribution long documented ethnohistorically and ethnographically, are now mediated and (re-)negotiated through the lens or filter of the twenty-first century globalized world. In this paper, we address postcolonial experiences of three interacting Amerindian groups: Trio, Wayana, and Waiwai. People, things, and ideas move between the Trio, Wayana, and Waiwai through social networks with varying degrees of formality. Two overarching questions inform our study: Are legacies of colonial encounters resulting in forms of ethnogenesis that might better be called ethnocidal? Are village communities that are comprised of people from different ethnic groups an artifact of globalization or part of an indigenous design that social anthropologist Peter Rivière called a "cultural kaleidoscope"?

[384] Chair

Siegel, Peter E. [180] see Duncan, Neil

Sierpe, Victor [233] see San Román, Manuel J.

Sierra, Roger [329] see Wesp, Julie K.

Sievert, April (Indiana University)**[264] Task, Activity, and Context: Integrated Approaches to Use-Wear Analysis**

Use wear has often been used to try to understand stone tools and tool types themselves. By focusing on lithics as used in specific tasks within activities that are part of larger contexts, relationships can be demonstrated and mapped using concept mapping tools. Use-wear studies deriving from complex agricultural sites in the Midwest are coupled with looks at activities performed by modern Native Americans.

Sigurðardóttir, Ragnhildur [77] see Hicks, Megan

Sikora, Martin [330] see Damgaard, Peter de Barros

Silbanuz, Floyd [229] see Levin, Maureece

Silis García, Omar (Dirección de Registro Público de Monumentos y Zonas Arqueológicas e Históricas) and Pablo Daniel López Sánchez (Dirección de Registro Público de Monumentos y Zona)**[328] Archaeological Property "Bienes Muebles" Registry in Particular Custody Such as Heritage Cultural Protection Mechanism**

In this presentation I'll review the public relevance concerning archaeological property "Bienes muebles," in particular custody. I'll describe the registry procedures and its scope as a cultural heritage legal instrument. Additionally, my objective is to present the way by which "Ley Federal sobre Monumentos y Zonas Arqueológicas, Artísticas e Históricas" enactment proclaimed the monuments as national properties, this way the law obligates the owners to register their monuments. We can understand the importance of registry as the first step in recovering stolen goods with the cooperation of other countries and Mexican states. Finally, I'll synthesize who natural persons owners guard the archaeological property "bienes muebles" and its status preservation.

Silliman, Stephen (University of Massachusetts Boston)**[172] Taking Archaeology to Heart: Reflections on Passions and Politics**

Talking about "heart-centered archaeology" is not necessarily easy, but it is easily necessary. Those of us who work with descendant communities know the power of the personal in making those projects possible, desirable, and enjoyable. As analytical as we must be, we must also have open hearts to those who experience the past(s) in more palpable, less academic, more heart-centered ways already. These can be profoundly transformative and positive, as they require more emotional and personal elements than archaeologists might normally engage. On the other hand, there are other non-archaeologists who seek discriminatory pasts to handle their own anxieties, nostalgias, and agendas. These are still heart-centered approaches, but much darker ones that we must confront with evidence and with stronger, more just hearts. All of these circumstances have changed my own engagements and passions. I entered archaeology decades ago because "I loved it" and the way it blended body and mind, but it has been important for me to engage not just body and mind but also heart in this long-term process. The heart that now propels my work is less the personal one about passions and more the social one about anger and rights.

Silliman, Stephen [141] see Sebastian Dring, Katherine

Sills, E. Cory (University of Texas at Tyler)

[281] Ancient Maya Salt Making Activities as Revealed through Underwater Excavations and Sediment Chemistry, Paynes Creek National Park, Belize

Underwater excavations at Early Classic Chan b'i (AD 300–600) and Late Classic Atz'aam Na (AD 600–900) ancient Maya salt works in Paynes Creek National Park, Belize, reveal activity areas associated with a substantial salt industry for distribution to the southern Maya inland inhabitants. At these sites, wooden architecture and salt making artifacts are abundantly preserved in a peat bog composed of red mangrove. We describe the excavation methods at this shallow, submerged underwater site, screening, analysis of recovered material, and collection of sediment for chemical analysis. The artifacts are overwhelmingly briquetage—pottery used to evaporate salty water by heating over fires to make salt. These excavations coupled with the results of sediment chemistry at Chan b'i indicate additional activity areas inside and outside of wooden buildings some of which are not evident from the artifacts recovered during excavations. The spatial distribution of briquetage and chemical analysis is evaluated in relation to interior and exterior of buildings and lines of palmetto palm posts. An abundance of briquetage and charcoal and the scarcity of domestic artifacts indicate that the sites were specialized salt works and not physically attached to households adding a new interpretation at the place of production.

[281] Chair

Sills, E. Cory [281] see Howie, Linda

Silva, Rosicler (Pontifica Universidade Católica de Goiás), Julio Cezar Rubin, Francisco Lorenzo and Daniel Correa

[62] Natural Processes and Anthropogenic Action: Compromising the Archaeological Heritage in the Southwest of the State of Goiás

Studies performed in the southwest of the state of Goiás indicate that natural processes and anthropogenic action are impacting and jeopardizing the conservation of archaeological sites in the region, namely GO-JA-13 and GO-CP-16, both of which are part of two important archaeological areas in the Brazilian Central Plateau—Serranópolis and Palestina de Goiás respectively. These sites are of high scientific and cultural significance and, together with the intense landscape alterations over the last decades, require a management plan. In this sense, the main purpose of the mitigating measures presented in this work is to stabilize the erosive processes which are compromising the archaeological sites more than anything else.

Silva, Fabiola

[327] Communities of Practice and Variability/Standardization of the Ceramic Assemblages: The Indigenous People Asurini do Xingu

I intend to present some results of my ethnoarchaeological research (1996–2016) on the ceramic technology of the Asurini do Xingu, an Amazonian indigenous people (Tupi-Guarani linguistic family) who lives on the banks of the Xingu River—Pará, Brazil. Based on collected data, I will demonstrate the relationship between the social organization of ceramic production and the standardization/variability of these artifacts over time. I will show how in Asurini context, teaching-learning framework, social identity, potter's ability/creativity and the scale of production of ceramics are aspects that directly influence the formal variability of ceramic assemblage.

Silverman, Shari (Washington State Parks and Recreation)

[307] Hood Canal, Washington: A Geoarchaeological Examination of Land Use

Hood Canal in Washington State contains a variety of archaeological sites, dating from at least 3,330 years ago to historic times. These sites include shell middens, villages, individual settlements, petroglyphs, logging activity traits, and hydroelectric features, to name a few. The area has undergone significant land movement due to seismic activity, landslides, and, possibly, sand blows. This presentation examines Hood Canal's prehistoric and historic land use with respect to the region's geologic history.

Silverstein, Jay (Univ of Hawaii/DPA)

[41] Culture and Battle: An Epistemological Approach to Warfare

The continuum of behaviors associated with war stretches from the act of killing to the profound ideology justifying the act. Thus the study of warfare encompasses a constellation of behaviors ranging from the ideological roots of political solidarity to the physical mechanics of death. Of the many aspects of war, battle represents the union of political and individual motive in a seminal action that often leaves a salient archaeological imprint circumscribed in space and time. However, bias, introduced by the veil of time and the sometimes ephemeral residues of war, meld with the bias embedded in the cultural context of the researcher. In this paper I present case examples of warfare studies I have conducted in Mesoamerica, Egypt, and with the POW/MIA recovery effort of the U.S. government. The studies, however, will be examined not merely from the archaeo-historic contexts of the conflicts, but through the introspective lens of my sociopolitical environment.

[41] Chair

Silverstein, Jay [41] see Pantel, Agamemnon

Simmons, Alan (University of Nevada Las Vegas, Department of Anth)

[132] Why Colonize? A Case Study of the Early Neolithic Colonization of the Island of Cyprus

Why humans colonize unoccupied lands, such as islands, has always intrigued scholars. Over the past few decades, researchers working on the Mediterranean island of Cyprus have documented both a Late Epipaleolithic occupation and a more substantial early Neolithic colonization episode. The number of such sites remains limited, but is growing with continuing research. For the Neolithic, both Pre-Pottery Neolithic A and PPNB occupations are now well-documented, and are as early as mainland sites. These defy earlier beliefs that the Mediterranean islands were not occupied until much later in the Neolithic. Most, but not all, sites are coastal, reflecting these new immigrants' sea orientation. Thus, we now know that early colonization occurred, but the question of why this happened remains largely unanswered. This presentation first examines characteristic elements of early Cypriot Neolithic settlements. Then, from a circum-Mediterranean framework, it looks at reasons why colonization may have occurred in the first place, at a time when the greater region was undergoing major social and economic shifts. Issues such as over-population, resource stress, economic or religious opportunity, internal dissension, or simply the urge to explore are all addressed. Some of these topics are especially relevant given the current immigration crisis in the Mediterranean.

Simmons, Scott (University of North Carolina Wilmington) and Bryan Cockrell (Dumbarton Oaks)

[135] Maya Metals: A Comparative Analysis from Tipu and Lamanai, Belize

Investigations at the southern Maya Lowland sites of Lamanai and Tipu, Belize have yielded diverse assemblages of metal artifacts. These metals are from the Postclassic and Colonial (twelfth to seventeenth century) occupations at Lamanai and Colonial (mid-sixteenth to early eighteenth century) contexts at Tipu. As a rare occasion to look at the similarities and differences between artifacts made of the same material from different sites, this research compares the forms, contexts, and technologies of metal artifacts from two sites having somewhat similar histories. At both sites metal objects

were recovered primarily from human burials and midden deposits. A program of typological study and compositional analysis revealed forms shared between the sites but evidence of on-site metallurgy only at Lamanai. The assemblages from these sites will be discussed in the larger contexts of metallurgy in other parts of the Maya world and ancient Mesoamerica as a whole.

Simms, Stephanie [5] see Bey, George J.

Simon, Rebecca L.

[155] *When Pots Walk: Reverse Archaeology at a Chaco Outlier Site in the Central Mesa Verde Region*

More often than not, cultural resources on private land experience development and/or intentional disturbance. Data from sites are often lost or compromised during these activities. Occasionally, landowners keep notes on material culture that may be passed on to archaeologists. Incorporation of these data is important to understanding the condition of the site and maximizing interpretations of the past. As Crow Canyon Archaeological Center embarks on a new multiyear research project, the Northern Chaco Outliers Project, consideration of what happened in the recent past is crucial. The focus of the project is the Haynie site, which experienced mechanical disturbance in the 1980s when the previous landowners sought out whole vessels to sell. Tracking down these artifacts using the landowners' notes will contribute to our understanding of social networks, the Chaco regional system, and the role of great houses as community centers in the northern Southwest. Data collection will utilize a reverse archaeology approach by organizing the notes from previous landowners in a database, interviewing previous landowners and others with knowledge of the site, contacting individuals who purchased artifacts, and conducting artifact analyses and data collection with permission from the artifacts' current owners.

[291] *Moderator*

Simon, Mary L. [181] see Witt, Kelsey

Simon, Arleyn

[208] *Discussant*

Simonetti, Antonio [4] see Cooper, H. Kory

Simova, Borislava (Tulane University), E. Christian Wells (University of South Florida) and Lisa LeCount (University of Alabama)

[274] *Exploring the Changing Roles of Maya E-Groups: Geochemical Analysis of E-Group Plaster Floors at Actuncan, Belize*

E-Groups were among the first monumental spaces constructed in Middle Preclassic Maya centers and served as important venues for negotiating social interactions and political integration of newly settled peoples. Starting in the Late Preclassic period, their roles began to shift. At some sites, such as Tikal and Uaxactun, votive offerings signifying communal ritual were replaced with dedicatory stelae or royal interments marking exclusionary practices and political appropriation of these spaces. Excavations within the eastern platform of Actuncan's E-Group lend evidence to suggest a different trajectory. Rather than exhibiting practices of exclusionary kingship seen at central Petén E-Groups, the Maya of Actuncan continued to cache ceramics and erect a variety of wooden features interpreted as temporary altars, shrines, or world trees. To help further understand the kinds of activities that occurred at Actuncan's E-Group and how they might have changed through time, we conducted geochemical analysis of five sequential occupation surfaces spanning the Late Preclassic Period (300 BC–AD 250). Results indicate the nature and distribution of activities during this period with implications for understanding the role of E-Groups in the evolution of Actuncan's site core.

Simpson, Bethany (UCLA) and Emily Cole (NYU)

[132] *Results from the 2016 Excavation of a Qarah el-Hamra, a Graeco-Roman Village in Fayum, Egypt*

This paper presents the results of the 2016 field season at the Graeco-Roman Village of Qarah el-Hamra. Located along the north shore of Lake Qaroun, the site was discovered in 2003 by the UCLA Fayum Project, and a magnetic survey in 2004 revealed the presence of an extensive settlement. Excavation that same year confirmed the existence of Greco-Roman remains, however the site remained otherwise unexplored until the start of this new field project in 2016. The new Qarah el-Hamra Excavation Project, directed by myself and Dr. Emily Cole, expands upon the earlier excavation and explores the relationship of the small site to its surrounding environment. Qarah el-Hamra is positioned between two much larger ancient town sites, Soknopaiou Nesos and Karanis. These towns have been heavily excavated and studied as independent sites, yet little is known about their connection to other settlements within the spatial and social network of the northern Fayum, and the role of small sites like Qarah el-Hamra are even less well understood. Our work at Qarah el-Hamra addresses the site's significance, its chronological development under Greek and Roman administrations, and socioeconomic strategies used by the inhabitants at both local and regional levels.

Simpson, Ian [190] see Madsen, Christian K.

Sims, Christopher (Archaeology Podcast Network)

[111] *Moderator*

[111] *Discussant*

Sinensky, R. J. (University of California Los Angeles) and Kellam J. Throgmorton (Binghamton University)

[368] *Indexing Mobility in the Western Puerco Region of Arizona using Paleoethnobotanical and Architectural Evidence*

The Western Puerco Region of East-Central Arizona contains a staggering diversity of architecture and material culture eluding to complex mobility practices that varied across time and space. Although archaeologists in the U.S. Southwest/NW Mexico have explored the sociocultural and ecological underpinnings that influenced household mobility, and have identified numerous lines of evidence that indicate increasingly mobile or sedentary habitation strategies, archaeologists have not developed robust quantitative methods for measuring and comparing mobility between individual households at the intrasite or intersite level. This poster presents results of an exploration of household residential mobility using indices developed with paleoethnobotanical and architectural data. We applied these indices to households in the Western Puerco Region dating between Basketmaker II and Pueblo III (500 BC–AD 1300) to chart long term and short term changes in mobility through time and space.

Sinensky, R. J. [266] see Throgmorton, Kellam J.

Singer, Zachary (University of Connecticut), Peter Leach (University of Connecticut; Geophysical Survey Syst), Heather Rockwell (University of Wyoming), Tiziana Matarazzo (University of Connecticut) and Krista Dotzel (University of Connecticut)

[262] *Intrasite Spatial Patterning of the Templeton Paleoindian Site in Northwestern Connecticut*

The Paleoindian occupation at Templeton is reconsidered based on research conducted since the site's initial study by Dr. Roger Moeller in the late 1970s. This poster describes the intrasite spatial patterning at Templeton gleaned from the 2016 excavations at the site and the reanalysis of the Paleoindian materials recovered by Moeller. Aspects of intrasite spatial patterning ascertained via ground-penetrating radar surveys of the landform, lithic microwear analyses, micromorphological sediment analyses, and analyses of phytoliths recovered from sediments also will be reported.

Singleton, Theresa

[64] *Moderator*

Sinkovec, Christina [301] see Kulisheck, Jeremy

Sinopoli, Carla (University of Michigan)

[167] *Discussant*

Sion, Julien (ArchAm-CEMCA), Alejandro Patiño-Contreras (Proyecto Petén-Norte Naachtun) and Divina Perla Barrera (USAC-Proyecto Petén-Norte Naachtun)

[125] *Los intercambios entre Naachtun (Guatemala) y el oeste de las Tierras Bajas durante el periodo Clásico: Una mirada a través de su cerámica*

Aun cuando Naachtun, una capital regional clásica, compartió una tradición cerámica con otros sitios del norte del Petén, en particular con la Cuenca Mirador, y recibió en ciertas épocas de su ocupación una fuerte influencia proveniente de ciudades del centro (Tikal-Uaxactun), además aparecen en su colección cerámica recipientes que reflejan intercambios con otras regiones de las Tierras Bajas. Dentro de esta cerámica importada, una cantidad significativa proviene del oeste de las Tierras Bajas y fecha en particular para el final del Clásico Tardío y el Clásico Terminal. De hecho esta época está marcada al nivel regional por transformaciones sociopolíticas importantes, especialmente la caída de la dinastía Kaan y de sus aliados como El Perú-Waka', en las cuales Naachtun ciertamente tuvo un papel notable. En esta ponencia se propone estudiar la relación entre los intercambios vistos a través de la cerámica y los cambios políticos ocurridos al final del periodo Clásico.

Sion, Julien [218] see Andrieu, Chloé

Sirak, Kendra [146] see Thompson, Jessica

Sisneros, Mathew [194] see Sparks, Shane

Sitek, Matt [202] see Goldstein, Paul

Sitzia, Luca [134] see Sepúlveda, Marcela

Siuda, Rafal [316] see Druc, Isabelle

Skaggs, Sheldon (Bronx Community College CUNY), Christophe Helmke (University of Copenhagen), Jon Spenard (California State University San Marcos), Paul Healy (Trent University) and Terry Powis (Kennesaw State University)

[267] *Some Thoughts on Altar 3, Pacbitun, Belize*

The rise of public monumental architecture in the Maya Middle Preclassic (900–400 BC) and the eventual development of divine kingship during the Early Classic (AD 250–550) constitute social processes that remain comparatively obscure. Nevertheless, they are increasingly illuminated as new empirical evidence is uncovered from research projects such as the Pacbitun Regional Archaeology Project. Ongoing work at Pacbitun, Belize, has brought to light considerable new information that can clarify these processes, in the form of early architecture in Plaza A, associated artifacts, and particularly carved monuments. Discovered during the 2016 field season, in Structure 25, within the palatial group, a new fragment of Altar 3 prompts us to reconsider the dating, stylistic attributes, iconographic program and epigraphy of this important monument. Here, we present a new drawing of the monument and comment on the temporal incidence of the iconography's stylistic attributes and touch on paleographic features of the epigraphy. Together these data provide us with important information concerning Early Classic kingship at Pacbitun, against which the secondary contexts wherein the fragments of this monument were found can be gauged, thereby begin to sketch out some of the historical benchmarks of this monument's biography.

Skala, Aurora (Kwusen Research & Media)

[273] *BC "Rock" Stars: The Next Generation*

This presentation will showcase a cultural rediscovery and ethnoarchaeology project taking place in Kitasoo/Xai Xais Nations' traditional territory on the Central Coast of BC in the town of Klemtu. In 2016, First Nations youth created a pictograph in their community using traditional materials and subject matter. The first painting of its kind in this area for approximately 100 years, it is a significant statement on the landscape. By encouraging youth to engage with archaeologists and embrace practices of their ancestors, the concept of conserving the very art form of creating rock art will be explored. Education and mentorship will be considered as core values which encourage conservation and stewardship. From sourcing pigments, researching designs and testing paint recipes, this project is the culmination of three years of youth-driven research. The archaeology and conservation approaches of North America differ significantly from European rock art conservation measures because of the cultural-continuity and contribution of the Indigenous descendant communities archaeologists are privileged to work with. As with the example of totem pole decomposition in BC, conservation, in this

specific instance, does not necessarily mean direct preservation of the archaeological record, rather, by preserving the practice, knowledge is conserved for future generations.

Skeates, Robin
[68] *Chair*

Skeens, Jeremy (University of Iowa)

[342] *Finding the Past in the Paste: Variance in Woodland Ceramics at Woodpecker Cave (13JH202)*

Five field seasons of excavations by the University of Iowa field school have recovered hundreds of ceramic pottery sherds from the Woodpecker Cave site. Previous typological analysis of the ceramic assemblage has supported the hypothesis of a multicomponent site that was host to seasonal occupations spanning hundreds of years. Woodpecker Cave provides a unique opportunity to study variation in ceramic technology within Midwestern cooking vessels across the Middle Woodland and Late Woodland periods. Microscopic examination of ceramic thin sections and their included minerals will showcase the progression of resource use within the region during that time period, and changes in technological choices made during production that aid in vessel function. Combined with spatial analysis, this interpretation can aid in establishing the chronology of Woodpecker Cave.

Skibbe, Adam [342] see McGrath, James

Skibo, James (Illinois State University)

[21] *The Joys of Boiling*

The list of the greatest technological innovations of all time include the wheel, bow and arrow, stirrup, and the controlled use of fire among other great human achievements. These technologies are given such prominence because they changed human history in significant ways. Never mentioned, however, is the cooking pot. Yet this common, inexpensive, utilitarian tool was an important part of profound, worldwide changes in cooking and food. Boiling or simmering opened up a whole series of new foods such as cereal grains, rice, potato, cassava, and other plants that are an important part of today's worldwide diets. Cooking food over a fire may have made us human, as Wrangham notes, but boiling, according to Levi Strauss, made us civilized. The cooking pot was part of a whole suite of sweeping worldwide changes that ushered in the Neolithic Revolution. In this paper I discuss the great advantages of boiling/simmering, and I make the case that the cooking pot should be listed as one of the greatest technological innovations of all time.

[314] *Discussant*

Skibo, James [341] see Hanson, Kelsey

Skinner, Anne R. [181] see Dakovic, Gligor

Skinner, Dougless and Kristen Barnett (Bates College)

[257] *Togiak Archaeological and Paleoecological Project: Exploring Relationships and Ecology at the Old Togiak Village*

The Togiak Archaeological and Paleoecological Project (TAPP) is a collaborative project driven by the Togiak community of southwest Alaska and their interests in documenting past lifeways at the Old Togiak Village. During the summer of 2015 The University of Montana conducted field work at the site using surface and sub-surface mapping to guide a noninvasive core sampling technique across the village, led by Dr. Kristen Barnett (Bates College). Thirty-five core samples were collected from a series of pithouse structures targeting high probability areas such as features and hearths. A range of data was recovered during analysis including lithics, faunal remains, botanical, charcoal, pollen, and a variety of other data allowing for C14 dating, and establishing a long history of village occupations ranging the past 1,250 years. This research utilizes results of the analyses along with localized Yup'ik perspectives in order to inform our understanding of the nuanced past at Togiak, promoting an equal and collaborative relationship between the indigenous community and archaeologists. In this research I will explore the importance of cultivating respectful relationships in archaeology, low-impact verses high-impact field techniques, ecological variation, and subsistence practices throughout the past 1,250 years at the Old Togiak site.

Skinner, Jane (Yale University), Timothy Hay (Pennsylvania State University), Katherine Smyth (ESRI), Jamie Quartermaine (Oxford Archaeology, North) and Ann E. Killebrew (Pennsylvania State University)

[151] *Landscape Archaeology and New Technologies at Tel Akko and in the Plain of Akko*

Excavations at the ancient port site of Tel Akko in 2010 were codirected by Ann E. Killebrew (Pennsylvania State University) and Michal Artzy (University of Haifa). Located on the only natural bay in the southern Levant, Akko is frequently mentioned in historical sources ranging from the Bronze Age through the present time. Among the Tel Akko Total Archaeology Project's primary goals is the development and implementation of new technologies devoted to 3D documentation and to a high resolution investigation of the environs of Tel Akko and the site within the context of the Plain of Akko. These include sophisticated and effective 3D recording of the ongoing excavation of on the tel, an intensive test-pitting survey of the mound, and a regional survey of the Plain of Akko utilizing lidar, 3D photogrammetry, and pedestrian survey. This poster presents the results of our 3D documentation from the excavation, the test-pit survey on the mound, and the application of lidar and photogrammetry to interpreting the Plain of Akko's ancient landscapes.

Skoglund, Peter (University of Gothenburg)

[28] *Animated Ships*

The rock art of southern Scandinavia includes a variety of images and among these are ships, humans and animal images. The ship is the most common motif and appears in various constellations. The ship may appear without associated images, it can be seen with a row of lines indicating a crew, and it can be associated to rather detail human and animal images. The process of adding humans and animals to the ships changed the significance of these images. In this paper I will go through some of the constellations in which the ship images appear, focusing on the addition of humans and animals to ships, as a mean of animating these objects.

Skousen, Benjamin (University of Illinois)

[157] *A Relational View of Pilgrimage: Movements, Materials, and Affects*

In this paper I discuss three tenets of what I call a relational view of pilgrimage. Overall, this perspective sees pilgrimage as a means through which people, things, places, and more move and converge in ways that instigate what Eliade (1959) called "hierophanies." The first tenet is that movement is

crucial—indeed, the nature of a pilgrimage depends on what, where, and how entities (human and nonhuman) move and assemble. The second is that objects and landscapes (e.g., relics, offerings, shrines, monuments) have histories and vitalities that influence these journeys. The final tenet is that pilgrimages are uniquely affective—they impact the senses, emotions, and sensibilities in ways that other activities do not. I explore this perspective and these particular ideas—movements, materials, and affects—through a narrative of the pilgrimage shrine at Lourdes, France. This example shows that a relational view encourages archaeologists to move beyond identifying pilgrims' traces and relying on functional and structural theories; it also enlivens, enriches, and better conveys the complexity of a pilgrimage. Perhaps most importantly, it illustrates that archaeology, with its focus on materials and space, has much to contribute to studies of pilgrimage.

[157] *Chair*

Skov, Eric [344] see Koerner, Shannon

Slaughter, Michelle [193] see Larkin, Karin

Slayton, Emma (University of Leiden), Ulrik Brandes (University of Konstanz) and Corinne Hofman (Faculty of Archaeology, Leiden University)

[296] *Modeling Water Routes through a Divide: Retracing Movement from the Greater Antilles to the Lesser Antilles in the Late Ceramic Age*

This paper focuses on modeling hypothetical sea routes between islands within the Caribbean Sea to try and redraw the map of social mobility and material exchange that existed during the Late Ceramic Age (AD 1250–1400). With the emphasis for modeling canoe pathways more focused on uncovering possible colonization routes, this map has yet to be thoroughly explored. However, analyzing the back and forth of travel between two sites known to be occupied during the same period can open up ideas on who was in contact due to the ease of connection between them. There are still many questions surrounding the specifics of difficulty and general progression of movement between the Caribbean Islands, in particular the connection between communities living in the Greater and Lesser Antilles during this period. Computer models of routes can provide more insight. The approach to modeling these pathways utilized a least-cost isochrone method to highlight time as a route cost. Additionally, as the models are based on environmental data—specifically current and wind—it is possible to evaluate seasonal trends.

[296] *Chair*

Slayton, Emma [133] see Ostapkowicz, Joanna

Sload, Rebecca

[386] *Reverential Termination of Sun Pyramid Cave, Teotihuacán: Round 2*

The predominant view is that the paucity of material remains from the cave under the Sun Pyramid is attributable to looting, often described as exhaustive. This paper disputes that speculation, based on lack of evidence and, more convincingly, on a paucity of material remains from contexts that could not possibly have been looted any time after Teotihuacán's applied concrete to the cave in the mid-third century CE. I present evidence for timing, termination ritual, sealing of termination contexts, and paucity of material remains from sealed contexts to argue that the dearth is explainable as part of a ritual of reverential termination.

Slocum, Diane (Northern Arizona University), Doug Tilden and Jaime Awe (Northern Arizona University)

[204] *Xunantunich Reloaded: Examining the Sociopolitical Significance of Structure A9*

Recent excavation of Structure A9 at the site of Xunantunich, Belize, confirmed that the mound represents the remains of a medium-size temple dating to the Late Classic period. Sub-surface excavations along the central axis of the mound revealed a large, vaulted chamber containing the remains of an elite individual. Two hieroglyphic panels flanking the building's front staircase identify a link between Xunantunich and three other Classic Maya polities: Caracol, Naranjo, and Calakmul. Exploration in front of the structure and at the base of an uncarved stela led to the discovery of two dedicatory caches comprised of obsidian and chert eccentrics. The tomb, the monuments, and the caches provide evidence of Structure A9's ritual significance. In particular, the tomb is not only a unique find at Xunantunich, where no burials in tombs have previously been discovered in the site core, but its exceptionally large size makes it an unusual feature in the western Belize region. This paper discusses the significance of this temple in the context of Xunantunich and the eastern Maya lowlands.

Slotten, Chelsi (American University)

[19] *Engendering the Bioarchaeology of the Viking Age*

Gender roles within Viking society are generally considered to be strictly binary. Some recent research has begun to challenge this assumption using textual and archaeological evidence. This paper will explore the ways in which an engendered bioarchaeology can contribute to a fuller understanding of gender during the Viking Age. Specifically, I will discuss what assumptions have been made in the past, and the importance of engendering bioarchaeological research. I argue that the application of gender theory can provide a more nuanced view of women's actual roles during the Viking Age and should be considered in all bioarchaeological analysis.

Slotten, Venicia (University of California, Berkeley)

[80] *Mesoamerican Plants of the Night: A Paleoethnobotanical Perspective*

The ancient Mesoamerican landscape has been extensively researched archaeologically, with the field of paleoethnobotany allowing for a better understanding of what plants the ancient people valued agriculturally and in their economic, ritual, medicinal and other daily practices. Typically, archaeologists interpret the archaeological record in terms of how the ancient peoples interacted with the artifacts and navigated through the landscape during the daytime. What about nightly practices? How have nighttime activities left their mark on the paleoethnobotanical record in Mesoamerica? The ancient Maya associated much of their environment to various night-related practices. The ancient nightly landscape can even be imagined through nocturnally active plants that either bloomed, were fragrant, or visibly illuminated in the dark. Mesoamerican interpretations of their environment can be seen through both their linguistic classifications of various species and also their nightly medicinal applications and preparations. Some plants held more of a symbolic meaning for the Maya, where nightly conditions determined their management strategies or even foretold the fate of the world. Ethnobotanical data helps illuminate how the ancient peoples at various Mesoamerican archaeological sites interacted with and viewed their nocturnal environment.

Smiarowski, Konrad (CUNY Graduate Center), Michael Nielsen and Christian K. Madsen**[224]** *Norse Greenland Farms and the Loss of Organic Preservation: No More Wood, Textiles, or Bones*

This presentation is an attempt to illustrate the scale of climate induced loss of organic preservation at Norse/Viking farmsteads in the Eastern Settlement of Southwest Greenland. For over a century now Norse Greenland has been associated with well-preserved sites, where wooden artifacts, bones and even textiles have been recovered. Archaeological investigations at sites that previously reported excellent preservation conditions suggest that recent climatic changes have had a wide and severe effect on sites in the whole region. Observations recorded during systematic coring surveys, large and small scale excavations, and keyhole archaeology in the last decade at ca. 90 Norse sites in The Eastern Settlement are confirmed by recent hard science investigations into the causes and processes of rapid midden decomposition in Western Greenland.

Smiley, Francis E. [301] see Terlep, Michael L.

Smirl, Nicole [263] see Efford, Meaghan

Smit, Douglas (University of Illinois at Chicago)**[128]** *Indigenous Miners and the Making of the Andean Markets in Colonial Huancavelica*

The mercury mines of Huancavelica have often been described through two familiar discourses in the colonial narrative, the European pursuit of wealth through extractive industries, and the simultaneous destruction of indigenous Andean communities through brutal forced labor and the corrosive effects of the colonial market. While these two historiographical traditions contain a great deal of truth, they can minimize the role of indigenous Andeans in the creation of new economic networks that eventually came to dominate the markets that developed around colonial mining centers. Drawing on household excavations and compositional analysis of ceramics found at Santa Barbara, the central settlement for indigenous miners, this paper will examine how different types of vessels moved in and out of commercial spheres of exchange. This research suggests that rather than seeing the colonial political economy as a singular set of capitalist practices exported from Europe that eventually produced a unitary market, an archaeological approach indicates the development of multiple and overlapping exchange networks produced by indigenous labor through their relations with each other and colonial institutions.

[128] *Chair***Smith, Alexander (College at Brockport, State University of New York) and Thomas Leppard (University of Cambridge)****[180]** *The Paleoenvironmental Impacts of Neolithic Colonization: Assessing Recent Palynological Data from the Mediterranean Islands*

The Mediterranean islands were colonized sporadically ~12–4.5 kbp by agropastoralists practicing mixed cereal, pulse, and fruit farming augmented by husbandry of ovicaprids, pig, and cattle. While the timing of these colonization events is relatively well-understood, the paleoenvironmental impacts of the introduction of this Neolithic package are not, particularly in terms of relative uniformity or variability. Here, we collate the available radiometrically anchored palynological data for the major Mediterranean islands, and assess whether or not there are general post-colonization trends. In so doing, we contribute to the wider study of the nature and severity of Neolithic colonization for island ecosystems.

Smith, Alexia (University of Connecticut) and Lucas Proctor**[27]** *Dung through the Microscope: A Close-Up View of Sample Origin*

In the 1980s, Naomi Miller's seminal publications detailing the use and identification of dung fuel within archaeobotanical samples at Malyan provided archaeobotanists with an alternate explanation for the source of plant remains preserved archaeologically, allowing for considerations of ancient fuel use and pasturing practices. Since then, archaeobotanists have generally relied upon wood to weed seed ratios or the composition of weed assemblages to support the use of dung fuel within flotation samples. However, some disagreement exists within the literature on how certain assemblages should be interpreted. If remains do originate from dung fuel, they hold the potential to inform us about use of the local environment, pasturing practices, and seasonality, but if samples represent mostly clean crop processing debris, the questions that can be reliably addressed relate to agricultural choices and organization of labor. Consequently, reliably identifying sample source is essential. This study examines experimentally charred caprid pellets, cattle dung, and wood fuel using scanning electron microscopy to help develop objective criteria for confirming the presence of dung within archaeobotanical samples. These criteria are then used to evaluate traditional interpretations of dung fuel use, wood fuel use, and agricultural processing activities within archaeobotanical samples from Southwest Asia.

Smith, Benjamin (University of Florida)**[55]** *Ground Stone Technology in the Late Pleistocene Horn of Africa: An Assemblage from Mochena Borago Rockshelter, Southwest Ethiopia*

Ground stone technology is an early component of the African Middle and Late Pleistocene hominin behavioral package. However, very little attention has been paid to quantifying Pleistocene ground stone variation in Africa. This paper describes a ground stone assemblage from the site of Mochena Borago in Southwest Ethiopia. The site plays a key role in testing the hypothesis that the highlands of Southwestern Ethiopia acted as a refugium for hunter-gatherer populations looking to escape environmental degradation associated with MIS 4 (73.4–60 ka BP). Ground stone is found interspersed throughout the assemblage with noteworthy concentrations below the earliest dated occupational horizons at ~54 ka BP. The ground stone component is composed primarily of expedient tools, or *outils a posteriori*, likely shaped through use rather than intentional design. A number of ground stone artifacts preserve ochre residues adherent to their working surface. Considered in light of previously analyzed ochre pieces from younger deposits at the site, these artifacts suggest that pigments were being processed throughout the site's occupational history. These analyses provide a platform to launch comparative studies of Pleistocene ground stone technology throughout the Horn of Africa.

Smith, Beverley (University of Michigan -Flint), Bonnie Styles (Illinois State Museum), Sarah Neusius (Indiana University of Pennsylvania) and Steven R. Kuehn (Illinois State Archaeological Survey)**[61]** *Exploring the Effects of Stabilizing Riverine and Lacustrine Environments on Archaic Faunal Exploitation in the Great Lakes and Prairie Peninsula*

The interplay among changing environmental forces affected the configuration of lake and river drainage systems after 6000 BP and the abundance, composition, and productivity of aquatic animal communities available to Early, Middle, and Late Archaic groups of the interior Eastern Woodlands. These environmental changes have long been suggested as powerful influences on selection strategies of animal resources during the Archaic period. Using the integrative applications of the Digital Archaeological Record (tDAR) to examine faunal databases, this paper considers the role of variability in resource availability and selection among sites in different aquatic settings, specifically the dendritic Saginaw River Valley of Michigan, the Mississippi and Illinois Rivers and their upland tributaries in the Prairie Peninsula of Illinois. These comparisons allow us to examine the influence of environmental and resource changes on subsistence change and variability. Potentially related changes and variability in demography, mobility, and cultural practices,

identity and interactions can then be considered in order to gain a more thorough understanding of the factors that influenced variability and diversity among Archaic peoples in these parts of the Eastern Woodlands.

Smith, Byron (Humboldt State University)

[44] *Land and Society: Evaluating Diversity in Land Use Strategies among the Classic Lowland Maya through Terrace Design and Maintenance*
Agrarian production in the Central Maya Lowlands during the Classic period was comprised of a variety of techniques that were used to satisfy dietary needs and to stimulate its subsistence economy. Rainfall totals and intensity along the variable topography of the region may have predisposed areas with less vegetative structure to soil erosion. Previous research suggests the application of terraced features by the Maya as a means to lessening the effects of surface runoff while also supplementing existing growing schemes. Increased labor investments during the construction of retaining walls, and throughout the cultivatable life of the growing fields (which includes maintaining soil quality) would have been essential to the production of a sustainable crop. The nutrient requirements of grain and legume yields demand adequately sustained levels of available (P) phosphorus to ensure growth. This research seeks to analyze levels of commitment through an appraisal of retaining wall design, as well as through the measurement of available (P) within the soil's matrix. The effects of past land use and management will be examined through the excavation of terraced features and through the chemical analysis of the soil's mineral content.

Smith, Claire (Flinders University), Ines Domingo (University of Barcelona), Didac Roman (University of Barcelona) and Gary Jackson (Flinders University)

[28] *Populations Expansion as a Replacement or Merging of Peoples: Insights from the Rock Art of Doria Gudaluk (Beswick Creek Cave), Northern Territory Australia*

The rock art of Doria Gudaluk (Beswick Creek Cave) in the Northern Territory of Australia provided a valuable lesson in the difficulties of interpretation without local knowledge. Now, newly recorded motifs at the site—some only visible through digital enhancement—highlight the dangers of relating stylistic changes to population replacement. When considered in the context of local history, developments in the rock art of Doria Gudaluk during the second half of the twentieth century can be understood as the result of new cultural collaborations between incoming groups and older, local communities.

[65] *Discussant*

Smith, David (Anthropology, University of Toronto, Mississauga)

[30] *Social and Cultural Influences on Weaning Practices*

Much of the research done on weaning practices among ancient societies is directed toward biological aspects of the weaning process. Some researchers have, for example, attempted to identify a "natural" weaning age determined by human primate origins. Surveys of weaning age among modern and ethnohistoric populations, however, demonstrate that weaning age is highly variable across diverse economies and categories of social organization. This pattern (or lack of pattern) suggests that a range of contingent factors impacts weaning practices. This paper will explore economic, social and cultural influences that may affect weaning practices within the context of a localized cultural niche in northwestern Cuba.

Smith, Erin M. (Washington State University, Pullman)

[393] *Interactions and Social Change in California: A Perspective from the Far West*

People in California have interacted with groups near and far for thousands of years. Here we take a big picture approach by looking at how interactions between people across time and space affect the histories of adjunct regions. In this paper, we first establish connections between people in California to the Northwest, Southwest, Mexico, and afar to demonstrate the scale of meaningful interactions. Second, by considering wide-ranging and long-term interactions, we better explain the agency and structure of the relationships forged between diverse people. These relationships are not static; they have been negotiated, redefined, and sometimes have been dissolved. Using archaeological and ethnographic data, we more closely examine the rise and demise of some of these relationships. Finally, we apply large-scale and long-term perspectives to address social change and issues of structural instability today.

[393] *Chair*

Smith, Frederick (Director of Archaeology, St. Nicholas Abbey, Barbados)

[64] *Discussant*

Smith, Geoff M. (Dept Anthropology, UC Davis)

[169] *When Lithics Hit Bones: Evaluating the Potential of a Multifaceted Experimental Protocol to Illuminate Middle Paleolithic Weapon Technology*

Recent zooarchaeological and isotope analyses have largely settled the debate surrounding Neanderthal hunting capacity. The vast numbers of Middle Paleolithic sites containing the butchered remains of large ungulates demonstrates the ability to obtain and, often, highly process these carcasses. Nevertheless, evidence for the effectiveness and ubiquity of Neanderthal hunting technology, specifically composite hafted tools, has not been illustrated across either their entire spatial or temporal range. In-depth studies have focused mainly on a small subset of lithic artifacts from assemblages emphasising features of breakage patterns, retouch, shape and use wear. While most studies have focused on damage to lithic material this study uses a multifaceted experimental program of controlled experiments in both a laboratory and more realistic setting. Such a two-fold approach allows for investigation of both the projectile delivery system and the resulting damage to both animal and projectile. Central to this research is whether diagnostic impact damage on both types of material can be identified and used in turn to infer Neanderthal hunting behavior. Evaluating the incidence of lithic and faunal damage signatures from such experiments will improve recognition of these signatures in the archaeological record and allow for a better understanding the mechanisms of Neanderthal hunting.

[169] *Discussant*

[169] *Chair*

Smith, Geoffrey (University of Nevada, Reno)

[79] *Paleoindian Lithic Conveyance and Land Use in the Northwestern Great Basin: A Summary of the Current Evidence*

For more than a decade, the University of Nevada, Reno has conducted archaeological survey in the northwestern Great Basin, searching for Paleoindian sites under the auspices of the Great Basin Paleoindian Research Unit (formerly the Sundance Archaeological Research Fund). Our work has identified a rich record of early occupation in southeastern Oregon and northwestern Nevada. Additionally, we have reanalyzed existing collections of Paleoindian artifacts from Last Supper Cave and Hanging Rockshelter. I review these efforts, focusing on the archaeology of Warner, Guano, and Hawksy Walksy valleys, Five Mile Flat, Last Supper Cave, Hanging Rockshelter, and the Black Rock Desert. I discuss the concept of "Lithic Conveyance

Zones," made popular in the Intermountain West by Charlotte Beck and Tom Jones, as well as site location and assemblage composition. I consider these data within broader patterns of settlement-subsistence, land use, and toolstone procurement in the northwestern Great Basin.

Smith, Heather L. (Eastern New Mexico University)

[226] *Fluted-Point Technology and the Nature of Its Transmission in the Western Canadian Ice-Free Corridor*

Recent analyses suggest that Paleoindian stage technology in the archaeological record of the Western Canadian Ice-free Corridor—fluted projectile points—can provide valuable evidence of the dispersal of Clovis and descendant groups northward as early Americans spread throughout the New World. This paper discusses recent geometric morphometric and technological evidence for fluted-point variation in the Ice-free Corridor, which possibly represents a variety of typological specimens spanning over 2,000 years of fluted-point use. Major factors of variability reflect the presence of Clovis-point morphology in the earliest deposits of the central Corridor, as well as specimens from the Great Lakes region and Folsom at other sites. Trends in the frequencies of technological characteristics suggest directional changes that may explain the nature of the transmission of fluting information into and throughout the Corridor and its adaptive context in late-glacial Arctic and Subarctic ecosystems. Conclusions address whether patterns in such technological trends between points from Alaska and northern Yukon, Canada, the Ice-free Corridor, and Clovis suggest that cultural transmission occurred between groups that met in the Ice-free Corridor during the terminal Pleistocene.

Smith, J. Gregory (Northwest College), Lawrence Todd (Park County Historic Preservation Commission) and Brian Liesinger (Heart Mountain Interpretive Center)

[394] *Community Archaeology at the Heart Mountain Relocation Camp, Park County, Wyoming*

Heart Mountain was one of ten confinement camps established by the U.S. government during World War II to incarcerate Japanese Americans living on the West Coast of the United States. Located in northwest Wyoming, the camp had a peak population of nearly 11,000 incarcerated, making it the third largest settlement in the state at that time. The Park County Historic Preservation Commission recently partnered with the Heart Mountain Interpretive Center to carry out mapping and test excavations at Heart Mountain. The bulk of the labor for the project was provided by some 45 community volunteers who worked a total of 627 hours. An in-kind matching grant procured from the State Historic Preservation Office provided funding to rehabilitate an original barrack at the Interpretive Center. Archaeological work focused on two 95 × 15 m root cellars at the site. In our week of fieldwork, we managed to create a topographic map of the two root cellars, test excavate one of them, and extensively photograph the vicinity using a drone. The positive feedback from community members will almost certainly lead to further work at the exceptionally rare and nationally-significant historical resource at the Heart Mountain National Historic Landmark.

Smith, Jolene

[66] *Discussant*

Smith, Karen (University of South Carolina), Vernon J. Knight, Jr. (University of Alabama), Julie G. Markin (Washington College) and Keith Stephenson (University of South Carolina)

[365] *Trend and Tradition in South Appalachian Carved Paddle Stamps*

The nature of Swift Creek design style has been a research focus of the lead authors for a number of years. In this poster, we broaden the discussion to include the full range of carved paddles, originally identified by W. H. Holmes as integral to the South Appalachian pottery tradition. Within the context of the stylistic principles of Swift Creek, as previously defined, we chart paddle stamping from its earliest beginnings ca 600 BC to the ethnographic present. Our concerns include establishing the emergence of Swift Creek out of the visually modest, but geographically more expansive, carved simple and check stamped paddles, to the timing of the de-evolution of the design style into a limited number of core elements with no complex elaboration by ca AD 800. We delineate the characteristics that set peripheral (e.g., Pickwick Complicated Stamped) and subsequent (e.g., Etowah Complicated Stamped) styles apart from the style at its most complex. We also offer ideas for the persistence of this multimillennia long paddle carving tradition and specific changes observed therein.

Smith, Kevin (Haffenreffer Museum, Brown University)

[133] *Dependent Independence? Identity, Interconnection, and Isolation in Iceland (AD 870–1800)*

This paper will explore intersections among international trade, domestic economy, and identity in Iceland from the time of its settlement shortly before AD 870 until its quest for postcolonial, independent nation status in the late nineteenth century. Focusing primarily on three periods—the Viking Age: AD 870–1050, the medieval/Sturlung period: ca. AD 1150–1300, and the Early Modern era, ca. 1500–1800—this presentation will integrate archaeological data gleaned from a range of recent projects with historical source materials to query standard models of this North Atlantic island's integration, isolation, or dependency through this 1,000-year span. Rather than focusing on models that have conceptualized Iceland and other North Atlantic Scandinavian outposts as passive actors on the periphery of dynamic European economic and cultural networks, this paper will consider Icelanders' agency in building, maintaining, or molding those networks as integral elements in the changing construction of Icelandic identity and society.

Smith, Maria (Illinois State University)

[185] *A Multi-Site Analysis of Intergroup Violence in East Tennessee of 1300–1600 CE: Temporal and Regional Patterns*

A meta-analysis of deliberate violent trauma (i.e., inflicted projectile points, antemortem blunt force cranial trauma, scalping, body element dismemberment and retrieval) in the human skeletal assemblages of twenty late prehistoric sites (N = 1,300+ individuals) was undertaken to determine temporal (Dallas phase [1300–1540 CE], Mouse Creek phase [1400–1600 CE]) and/or regional patterns within the Ridge-and Valley physiographic province of East Tennessee. The site samples were retrieved from what are now six reservoirs that impound either the main channel of the upper Tennessee River (Chickamauga and Watts Bar Reservoirs) or its tributaries (the rivers of Clinch-Powell [Norris and Melton Hill Reservoirs], Little Tennessee [Tellico Reservoir], Hiwassee [Chickamauga Reservoir], and French Broad [Douglas Reservoir]). The results indicate distinct regional differences in pattern and prevalence of violent trauma that co-associate with population density. Additionally, lower East Tennessee, despite evidence of sociopolitical change (Dallas phase to Mouse Creek phase), has the highest prevalence of intergroup (i.e., lethal) and interpersonal (i.e., nonlethal) deliberate trauma. The interregional differences parallel previous archaeological assessment of mortuary patterning that identified 'ethnic' differences in east Tennessee and, are apparently coincident to the descriptions by the Hernando de Soto Entrada of 1540 for the (elusive) boundary of the Coosa polity.

Smith, Michael (Arizona State University)

[277] *Why Settlement Scaling Research Is a Good Fit for Archaeology*

Although initially developed to understand contemporary urban systems, the method and theory of settlement scaling are particularly appropriate for archaeological data. The scaling framework can be seen as an outgrowth of existing archaeological research on demography and settlement patterns.

Although developed independently, the “social reactor” model that explains observed patterning is in fact well-grounded in anthropological and archaeological theory. The key process that drives change is “energized crowding,” or the social interactions among individuals within the built environment. The scaling framework is general enough to apply to settlements in all types of human societies; it does not require the institutions or behaviors of the contemporary capitalist economy. This is a thoroughly empirical line of research that generates propositions that can be rigorously tested against archaeological data. Our positive findings to date contribute to a richer and broader fundamental understanding of human settlements, their generative character, and their changes over time.

[291] *Discussant*

Smith, Michele (Haffenreffer Museum of Anthropology)

[209] *Globalization, Trade, and Magic: Weaving the Threads of Iceland's Viking Age Textiles*

Icelandic Viking Age (ninth–eleventh-century) textiles are less frequently reported than their medieval counterparts, yet mineralized pseudomorphs adhering to copper alloy objects from burial contexts and a small number of items that survived in their organic forms suggest that this North Atlantic colony's textiles filled multiple roles and were produced through technical approaches with diverse origins. In the North Atlantic's Viking Age, some textiles were used as a form of currency within a commodity-money system that had continental Scandinavian counterparts and, perhaps, origins. Others were produced through approaches that integrated techniques linked not only to Scandinavia but also to other parts of the North Atlantic, including Scotland. Textiles dyed with plants brought from continental Europe, silks imported from the Mediterranean area as luxury items, and prestige goods embellished with copper, silver, or gold threads speak to the multifaceted social uses and origins of textiles in Viking Age Iceland. Using archaeological and literary sources this paper will suggest not only that textiles were socially and economically important but also that they were imbued with mythological and magical meaning and were pivotal in trade networks reaching from the North Atlantic to Europe and the Middle East.

Smith, Monica (UCLA)

[324] *Does the Site-Size Hierarchy Concept Mask the Complexity of Urban-Hinterland Relations?*

The site-size hierarchy concept was born of a marriage between a long-standing interest in the emergence of the state and the mid-twentieth-century development of systematic regional survey projects. The assumption of equivalence between sites and territorial complexity facilitated an intellectual investment in survey data beyond a mere tally of sites toward an analysis of the way in which political administrations functioned at the landscape scale. The resultant easy equivalence of four-tiered site size hierarchies as characteristic of states, and three-tiered hierarchies as indicative of chiefdoms, has become a standard mode of comparative description, so much so that the original formulators of the concept are no longer cited. Yet everything about the site-size rubric, from the reliability of surface-survey data to the recognition that small sites are sometimes quite powerful political entities, should prompt a reevaluation. Using evidence from eastern India where surveys and excavations have focused on social and economic relationships among different-sized sites, the paper examines the way in which visible areal dimensions are only one measure of regional political integration. Territorial interactions among population centers are likely to be more varied than simple hierarchical models allow, encompassing the potential to identify heterarchical, corporate, and situational-network configurations.

[277] *Discussant*

Smith, Neil G. [29] see Levy, Thomas E.

Smith, Nicholas (Columbia University in the City of New York), Sarah Hlubik (Rugters University), Tamara Dogandžic (Max Planck Institute for Evolutionary Anthropology) and David R. Braun (George Washington University)

[193] *Application of Photogrammetric Methods to Archaeological Site Documentation: Archaeological and Experimental Case Studies*

Photogrammetry is a powerful tool using images to create three-dimensional (3D) models of objects and landscapes. Advances in software and personal computing have made photogrammetry an important instrument for the documentation of archaeological sites. Despite this, using photogrammetry to understand spatial data within archaeological sites is uncommon. Recording spatial data on sites is usually done by hand-measuring artifacts within a grid or by using a total station for more accurate mapping and piece plotting. Using photogrammetry to create a 3D model of excavations may be a more expedient method, but the accuracy and precision of spatial data using this technique has not been fully investigated. Here we present data from experimental and archaeological excavations to determine how effective this technique is for reconstructing and preserving primary 3D coordinate data from sites. We compare accuracy and precision of 3D coordinates using three techniques: traditional hand-measurement, total station data, and photogrammetry. We apply these techniques in several experimental and archaeological contexts. This technique could be useful for small-scale excavations with equipment limitations, or in larger projects to document expedient test excavations. This research was supported by the National Science Foundation International Research Experience for Students OISE 1358178 and 1358200.

Smith, Nicole (Hakai Institute), Skye Augustine (Parks Canada), Dana Lepofsky (Simon Fraser University), Christina Neudorf (University of the Fraser Valley) and Keith Holmes (Hakai Institute)

[77] *Clam Gardens: Ancient and Living Landscapes in the Salish Sea*

Clam gardens are rock-walled, intertidal terraces constructed by the coastal First Nations of British Columbia (Canada) and Native Americans of Washington State and Alaska (USA) to enhance the shellfish productivity of beaches and rocky shorelines. This presentation highlights recent work in the Salish Sea by members and partners of the “Clam Garden Network,” a community of First Nations, academics, researchers, and resource managers interested in the cultural and ecological importance of clam gardens and traditional clam management. In this presentation we focus on archaeological studies that help to understand the clam garden landscapes of Quadra Island and the southern Gulf Islands. Through excavation, drone mapping, radiocarbon and optically stimulated luminescence dating we are better able to understand how Nations built, maintained and used clam gardens continuously for the last 2,100 years, even amid changing sea levels. We examine how luminescence signals in vertical sediment cores are informing our understanding of traditional management philosophy, and we discuss the ways in which archaeologists are participating in the eco-cultural revival of two clam gardens in the southern Gulf Islands; a collaborative project led by Parks Canada and the WSANEC and Hul'q'umi'num Nations aimed at restoring the local ecosystem and cultural connections to place.

Smith, Ryan (University of Pittsburgh)

[233] *Understanding an Alternative Pattern of Coalescence: A Study of Architecture and Organization at a Non-fortified, Pre-Inca Town in Highland Peru*

This study presents an analysis of the architecture and spatial organization at Maukallaqta de Nuñoa, a prehispanic site within the highlands of Peru dating to the Late Intermediate Period (AD 1000–1450). Within the northern Titicaca Basin where the site is located, hillforts dominate the archaeological landscape during this time as a result of increased political fragmentation and social discontinuity. While these hillforts often display very little architectural investment other than their fortification walls, Maukallaqta boasts over 300 well-preserved house structures along with dozens of chullpa burial towers, slab-cist tombs, and other structures which are unevenly distributed throughout the site. The organization and spatial relation of these

structures in addition to the site's non-fortified nature provide immediate clues as to the exceptional use of this space during the Late Intermediate Period. Preliminary results based on site-wide architectural mapping and further GIS analysis demonstrate fundamental differences between the planning, use of space, and nature of social life at Maukallaqta and that of contemporaneous hillforts.

Smith, Sarah (Amec Foster Wheeler), Cara Brendzy (Sto:ló Resource and Research Management Centre) and Lisa Dojack (Sto:ló Resource and Research Management Centre)

[17] *Archaeological Investigations at the Sto:ló Spiritual Site Uwqw'iles: The Restmore Caves Site (DiRj-34)*

In 2014 Amec Foster Wheeler, in partnership with the Sto:ló Resource and Research Management Centre, conducted an archaeological investigation of rockshelter site DiRj-34 in response to a proposed development. The site was documented ethnographically by Wilson Duff in 1949 as the Restmore Caves and recorded as spiritual site Uwqw'iles by the Sto:ló Nation. The rockshelter is comprised of large boulders at the toe of the Canadian Cascade Range, adjacent to Hunter Creek on the south side of the Fraser River in S'olh Temexw. The site is located between Hope and Chilliwack, in southwestern British Columbia, Canada. The identification of stratified cultural layers, archaeological features, diagnostic lithic tools and the analysis of radiocarbon data provides a framework for placing the site into the oral and ethnographic history of the Sto:ló. The results of systematic data recovery and radiocarbon sampling are presented in the context of ethnographic and traditional use information. By comparing ethnographic information recorded on the rockshelter site, the cultural narrative associated with the Uwqw'iles spiritual site, and data collected during preliminary archaeological excavations, we provide a glimpse into the cultural landscape of the area, focusing on changing site-use and settlement patterns over time.

Smith, Stefanie (New South Associates, Inc.)

[248] *Privy Perspectives: The Zooarchaeology of Urban Mobile and Its Nineteenth-Century Occupants*

Data recovery excavations at Site 1Mb504 in the downtown section of the City of Mobile, Alabama produced a large assemblage of faunal material relating to the nineteenth century occupation of the surrounding city blocks. By the 1840s, the area was occupied as a residential block including the private homes of merchants, doctors, and other professionals, as well as boarding houses for similar professional classes. In the 1910s, land use began to shift from residential to commercial. By the 1950s, businesses outnumbered residential houses. Faunal material from the site was mostly recovered from the privy features attributed to the original residential occupation of the neighborhood. Zooarchaeological analysis of the recovered faunal material indicated that the average diet was heavily reliant on domestic animals. The consistent presence of wild birds and both freshwater and marine fish suggests that these animals were included as supplementary foods. A comparison of faunal material from privy to privy shows some variety in consumption practices between households.

Smith, Stuart (UC Santa Barbara)

[219] *Entangled Lives: Intercultural Interactions in the Nubian Borderland*

Anthropological theories of cultural interaction, in particular entanglement, can help shed light on how individual choices drove intercultural interaction between Egypt and Nubia in the context of a colonial borderland. This paper explores how recent archaeological work in Nubia is breaking the simple Egyptian-Nubian dichotomy that has characterized previous discussions of interactions between the two African cultures. Taking their cue from Egyptian ideology, Egyptologists have often depicted Nubia as inferior, dominated both militarily and culturally by its northern neighbor. Similarly, the Third Intermediate Period in Nubia has been seen as a dark age, a boundary between civilization and a return to barbarism. This process of cultural and political regeneration in Nubia eventually led to the rise of the Nubian 25th Dynasty, whose pharaohs ruled Egypt for nearly a hundred years (c. 747–656 BCE). Recent archaeological work reflects a much more complex picture of intercultural interactions that were by no means unidirectional. Understanding this complicated transition requires a nuanced approach that avoids simple explanations based upon the deeds and pronouncements of kings in favor of an archaeological focus on the accumulation of subtle shifts in local interactions and the cultural and biological entanglements that led to regional change.

Smith, Tara (Texas State University)

[3] *Cosmic Ventures of the Olmec Dwarf: An Analysis of the Dispersal and Transformation of Dwarf Imagery within Olmec Iconography*

The formative period dwarf imagery in Mesoamerica offers an exemplary opportunity to further our understanding of the Olmec cosmovision and how their ideology spread throughout the region. This study specifically compares the three monumental sandstone dwarfs at La Venta to the portable dwarfs carved in stone and sculpted from clay found elsewhere within the Olmec exchange network. I discuss the origin of Dwarf imagery within the Olmec artistic style through an analysis of stylistic trends and by upstreaming from the Maya. Ultimately, I present evidence that shows dwarfs as transformative beings, likely associated with creation events and cosmic travel; a transformative sequence can be identified when viewing the corpus as a whole, further alluding to the ritualized nature of dwarf imagery. Moreover, the evidence suggests, and I concur, that the phenomenon of dwarf representations originated in the periphery regions of Olmec influence and was later incorporated into the heartland, manifesting in the monumental sculptures at La Venta.

[3] *Chair*

Smyth, Katherine [151] see Skinner, Jane

Snead, James (California State University Northridge)

[98] *Water Wars: The St. Francis Dam Disaster and Resource Competition in the American West*

Euro-American experience in the western states has been profoundly shaped by the fight for resources, among which water ranks extremely high. Traditional histories of such struggles focus on policy, macroeconomics, and large-scale social transformation. Historical archaeology, in contrast, offers the opportunity to emphasize the quotidian manifestations of these conflicts, particularly as they shaped the lives (and deaths) of local residents. Current fieldwork conducted by California State University, Northridge (CSUN) emphasizes landscapes associated with the Los Angeles Aqueduct, constructed between 1908 and 1913 and one of the most "iconic" features of the struggle over resources. In particular we have focused on the St. Francis Dam disaster of 1928, an aqueduct-related catastrophe that took hundreds of lives and destroyed vast swaths of countryside. This work, involving survey, excavation, and extensive engagement with stakeholders, offers a new look at the "water wars" from the perspective of those most directly engaged.

[98] *Chair*

Snitker, Grant [129] see Strawhacker, Colleen

Snitker, Grant (Arizona State University)

[336] *Reconstructing Anthropogenic Fire Regimes Using Multidisciplinary Methods: Preliminary Results from the Neolithic (7700–4500 cal BP) in Eastern Spain*

Charcoal is produced by the incomplete combustion of plant tissues and is used as an indicator of prehistoric fire activity in archaeological and paleoecological contexts. For millennia, humans have played an active role in shaping fire regimes, making the quantification and analysis of paleo-charcoal important for understanding long-term, social-ecological systems. Globally, prehistoric transitions to agriculture often coincide with increases in fire frequency and changes in vegetation community composition and distribution. Although this phenomenon is commonly identified in paleoecological studies, archaeological research has not yet fully incorporated the spatial and temporal dimensions of anthropogenic fire into discussions of the development of agricultural landscapes. This paper addresses these issues by presenting preliminary results from a multidisciplinary research project combining an in-depth examination of sedimentary charcoal data, archaeological measures of agricultural land use, a spatial models of prehistoric fire regimes during the Neolithic (7,700–4,500 cal BP) in eastern Spain.

Snoeck, Christophe (Vrije Universiteit Brussel), Joanna Ostapkowicz (National Museums Liverpool), Rick J. Schulting (University of Oxford), John Pouncett (University of Oxford) and Philippe Claeys (Vrije Universiteit Brussel)

[69] *Strontium Provenancing Wooden Artifacts from Pitch Lake, Trinidad*

Several wooden artifacts were found at Pitch Lake, Trinidad, one of the world's largest asphalt "lakes," and a recent dating program has shown that they range from ca. AD 600 to 3000 BC. This paper reports on the investigation of their provenance through strontium isotope analysis, with the aim of establishing whether the artifacts were made locally or were imports from other regions of Trinidad or even beyond the island. A major challenge of working with wooden artifacts found in Pitch Lake is contamination: while ensuring the overall preservation of the artifacts, the pitch and other elements present in the lake could add some exogenous strontium to the samples leading to erroneous measurements. This paper provides an overview of the extensive pretreatment protocols to remove any possible contamination from the samples, and compares the results achieved to those from over 130 modern plant samples spanning Trinidad and Tobago collected during recent fieldwork. We discuss the artifacts' possible origins and the implications for the understanding of interactions in and beyond Trinidad.

Snoek, Conor [339] see Rice, Sally

Snortland, Signe [229] see Banks, Kimball

Snow, Meradeth (University of Montana), Clare Super (University of Montana) and Anna Marie Prentiss (University of Montana)

[50] *Ancient DNA from Stone Tools*

Proteins and DNA can be trapped in the microcracks on the surface of stone tools, which can then be extracted and analyzed to aid in inferring the use of the tool (Shanks et al. 2001, 2005). This nondestructive method involves the use of sonication to release DNA from the microcracks, then amplification of regions of mitochondrial DNA that are species specific. This technique was applied to ground and chipped stone from the Bridge River site in British Columbia. Focus on groundstone was of particular interest, due to debate over its use in either food preparation or bone tool creation. If used for bone tools, the potential to identify which species, such as deer or bear, was also addressed. Scrapers were also analyzed in order to surmise the species the tool had been used on. This technique provides an interesting new avenue of investigation into the use of lithics from archaeological sites.

Snyder, Brian

[184] *An Examination of Variation in Hafting Configuration among Early Paleoindian Projectile Points*

In this paper I use a combination of experimental replication, microscopic use wear analysis, and morphological analysis to investigate questions about the differences in hafting technology between Clovis, Folsom, and Midland projectile points. The transition from Clovis to Folsom culture is still poorly understood, and changes in hafting technology are part of the transition. In addition, the question of why fluted (Folsom) and unfluted (Midland) projectile point forms are found in the same temporal contexts at Folsom-age sites looms large. These questions have implications for how technology can be used to overcome environmental stressors, such as the climatic changes at the end of the Pleistocene. My research uses a behavioral ecological approach aimed at understanding change through time and cost/benefit decisions related to technologies of varied effort-cost. I examine these problems in a pilot study using a combination of experimental replication of impact-related use wear using a calibrated crossbow and ballistic gel targets, combined with morphological and use wear analyses of existing prehistoric collections. My research seeks to develop new knowledge on the differences in early prehistoric technologies and cost/benefit decisions about subsistence technology in the early cultures of the Plains and Southwest.

Sobel, Elizabeth [89] see Bruns, Laura

Sobotkova, Adela

[149] *Discussant*

Sofian, Harry Oktavianus [180] see Ono, Rintaro

Sohler-Snoddy, Anne Marie [30] see King, Charlotte

Solazzo, Caroline, William Fitzhugh, Susan Kaplan, Charles Potter and Jolon Dyer

[190] *Molecular Markers in Keratins from Hair and Baleen for Species Identification of Archaeological Artifacts*

In this paper, we present a methodology to identify organic remains from Arctic and Subarctic origin. Peptide mass fingerprinting (based on the characterization of specific peptides from proteins) is a rapid and efficient method for species identification, which requires little material and provide results on processed and degraded material. Recent studies of ancient marine mammals' remains has used collagen peptides in bones and skins for species identification. Here we demonstrate the application of peptide mass fingerprinting in hair and baleen; both materials are made of alpha-keratins. Baleen, or whalebone, has been harvested for thousands of years from Mysticeti whales. It was appreciated for its horn-like, flexible properties and used for tools and cultural objects. Baleen constitutes a rich source of biomolecular information with potential to contribute to studies of conservation and the exploitation of Mysticeti whales in past and recent times. We examined baleen from ten different species of whales and determined specific molecular

markers for all species. The methodology was used to successfully identify baleen scraps from an archaeological assemblage from Labrador that span up to 1,500 years of aboriginal whaling. Hair remains from these sites were also identified to species from a build database of keratin markers.

Solinis-Casparius, Rodrigo (University of Washington), Anna Cohen (University of Washington) and Christopher T. Fisher (Colorado State University)

[118] *Integrating Lidar with Pedestrian Survey at the Ancient City of Angamuco, Michoacán, Mexico*

Remote sensing techniques have enhanced studies of ancient urbanism particularly because they have improved the speed of data collection and our abilities to identify the extent of urban sites. Data derived from airborne laser scanning such as lidar have been rapidly incorporated to study settlement patterns in order to accelerate the survey process, but also to produce innovative and higher quality data. In this paper, we discuss the use of lidar and traditional pedestrian survey data at Angamuco, an ancient city within the Purépecha imperial heartland in Michoacán, western Mexico. Between 2009 and 2011, the Legacies of Resilience Project mapped over 7,000 architectural features that comprise roughly 17% of the 26 km² Angamuco urban core. We explore how the integration of these datasets helps us to better understand urbanism and demography in prehispanic Mexico and how these data can be used to document archaeological heritage that is impacted by modern development and looting.

Solis, Kristina (University of Texas at San Antonio)

[245] *Strontium Stable Isotope Ratio Analysis of the Loma Sandia Archaic Period Mortuary Site of South Texas*

Models of hunter-gatherer territoriality are derived from the ethnographic record but have rarely been directly evaluated with archaeological data. Mortuary sites on the Texas Coastal Plain have long been thought of as a product of hunter-gatherer territoriality. Strontium stable isotope ratios from human tooth enamel can be used to estimate the origin of individuals and can evaluate evidence for territoriality. This paper will report the results of strontium stable isotope ratios analyzed from 54 human teeth from the south Texas mortuary site of Loma Sandia dating to 2850–2550 BP. Strontium bio-availability is preliminarily assessed with fauna from two nearby geological regions. The data analysis of this NSF-funded dissertation project evaluates the variability in the geographic origin of individuals designed to assess the degree of territoriality. Differences between males and females may indicate mobility related to post-marital residence rules.

Solis, Reyna (Museo del Templo Mayor-INAH) and Emiliano Melgar (Museo del Templo Mayor-INAH)

[94] *Jadeite and Exotic Greenstones in the Huastec: The Mayan Style Lapidary Prestige Goods at Rancho Aserradero and Tamtoc*

The archaeologist of INAH recovered hundreds of lapidary items at Tamtoc and Rancho Aserradero. Among these pieces, there are glossy greenstone objects restricted to the burials of both sites. The chemical composition and mineralogical characteristics of them with Micro-Raman, XRF, and FTIR, allowed us to identify two exotic raw materials, jadeite and green quartz from the Motagua Valley in Guatemala. Also, with the technological analysis of their manufacturing traces with Experimental Archaeology and Scanning Electron Microscopy, these objects showed a foreign lapidary style that shares the tools and techniques detected on Mayan jewelry, especially jadeite pieces, and differs with the Huastec lapidary technology. Based on these results, we could infer the symbolic employment of these exotic greenstones in the burials as long-distance prestige goods for the elite members. Also, these are the northernmost confirmed jadeite pieces found in Mesoamerica, opening new researches about the acquisition, production, and distribution of luxury items in Ancient Mexico.

Solis Marín, Francisco [225] see López Luján, Leonardo

Solovyeva, Vera (American Museum of Natural History) and Amy Tjong (American Museum of Natural History)

[138] *The Revival of Gut-Skin Parka Production among the Siberian Yupik*

The Siberian collections at the American Museum of Natural History (AMNH) are one of the world's most important collections of cultural artifacts from Northeast Siberia. These artifacts were created as a result of the historic Jesup North Pacific Expedition (1897–1902), which sought to study the cultures framing the Bering Sea. In 2014, the Conservation Department at AMNH began a two-year project to stabilize and rehouse 100 items from this collection, including 14 gut-skin parkas attributed to the Siberian Yupik people. The project involved research of gut-skin properties to understand processing and manufacture, and to develop suitable treatment methodologies. Consultations regarding material processing and cultural significance of the parkas and gut skin were conducted during a visit to source communities in July 2016. Information sharing about the current state of the Siberian collections and research was also a vital part of the work. Due to political and ecological factors in the region, the tradition of manufacturing gut parkas is at risk of disappearing. There is an expressed interest among local community members to revive the technology. Access to the AMNH collection and outreach as a result of the Siberia project play a key role in the revival.

Somers, Bretton

[281] *Spatial Analysis of the Preserved Wooden Architectural Remains of Eight Late Classic Maya Salt Works in Punta Ycacos Lagoon, Toledo District, Belize*

In 2005, eight Late Classic Maya sites with the remains of wooden posts were found beneath the surface of Punta Ycacos Lagoon in southern Belize. The presence of briquetage on the surface and embedded among the clusters of wooden architectural features implies association with salt production activity. This research employed a rigorous field survey, combined with mapping, sampling, and building a GIS. Detailed analysis of the spatial distribution of wooden posts was conducted to determine if comparisons could be drawn to ethnohistoric examples of wooden architecture reported among the Maya and in Mesoamerica. This research found that there are patterns in post distribution, some of which compare to ethnohistoric examples of wooden architecture. This study emphasizes that there are rectilinear patterns in the placement of posts. This research did find positive results from the use of in-the-field GIS analysis to recognize patterns and predict missing data. This study was part of a larger ongoing project "Mapping Ancient Maya Wooden Architecture on the Seafloor" that will continue to address these problems and build upon this research.

Somers, Bretton [281] see Johnson, Kelsey

Somerville, Andrew [284] see Schoeninger, Margaret

Sonderman, Eleanor (Texas A&M University)

[104] *Analysis of Perishable Artifacts from Conejo Shelter, Texas*

Conejo Shelter (41VV162) is a perennially dry rockshelter in the Lower Pecos region of southwest Texas. This shelter was excavated in the late 1960s by the Texas Archeological Salvage Project, an offshoot of the joint Smithsonian and National Park Service River Basin Survey program, as part of

mitigation efforts during construction and inundation of Amistad Reservoir. As is common among the rockshelter habitation sites in this region, the artifact assemblage from Conejo Shelter is largely composed of perishable artifacts. While the perishable artifacts from several other shelters and caves in this and other parts of western Texas have been studied quite extensively, very little is known or published about the remarkable assemblage of perishables from Conejo. Current efforts are working to close this dearth of research through recording and analysis of all perishables, particularly the sandals in the assemblage. Sandal analyses have included conservation, comparative studies of size, structure, and manufacturing techniques—particularly among anomalous forms, and acquisition of direct radiocarbon dates from the sandals themselves. Results of these analyses expand current understanding of perishable technology adaptations and artifact use-life behaviors and align the sandal assemblage at Conejo within existing typologies and chronologies.

Sonderman, Robert and Stefan Woehlke

[2] *Our Collections at Risk: Climate Change Threats to NPS Museum Property*

Over the past 15 years NPS Collections from Texas to Maine have faced devastating impacts from hurricanes and other climate related events. During this time, Hurricanes such as Isabel, Ivan, Katrina and Sandy have wrought havoc on NPS museum collections. Although not subjected to direct impacts from these recent hurricanes, National Capital Region (NCR) parks have been heavily damaged by their collateral impacts, typically in the form of flooding along the Potomac Valley. It is simply a matter of time before a major hurricane strikes right at the heart of the Nation's Capital. Our recent brush with Hurricanes Joaquin and Hermine highlight the risks we face in NCR from a devastating Hurricane event and its related impacts. Over the past two years the NCR Museum Management Program has been gathering data and developing an assessment of park collection vulnerabilities due to climate change in NCR. This brief presentation will discuss those threats and highlight how some NCR parks are addressing those threats.

Song, Yanbo (Shandong University) and Zebing Wang (Underwater archaeological research center of Shand)

[116] *Research on Faunal Remains at Gedujing Site, Muping, Shandong Province*

Animal remains excavated from Gedujing can be divided into two stages: 1) the earlier (5925–5880 BP), and 2) later (5880–5530 BP) periods of the Early Dawenkou Culture. In both stages, identified animals include: mollusk, fish, amphibian, bird, deer, dog, pig, raccoon dog, rabbit and rodent. Crab and sand badger are also found in the later period. The identified fauna indicate that the environment around the site did not change much in the few hundred years between the early and later periods. According to the quantity of animal remains, the use of aquatic animals, especially marine mollusks, increased in the later period. This indicates that ancient peoples' abilities of cognition and exploitation of marine resources increased as time went by. Most of the excavated pigs from the site are domestic pigs; and wild boars are also present. In the view of the total mammals composition, pigs take up more than 50% (NISP and MNI) in both earlier and later periods. This shows that ancient people fed domestic pigs in order to obtain a stable meat source. They also hunted wild mammals, especially deer, and caught aquatic animals as important supplementary sources of meat.

Sorensen, Marie Louise [32] see Evans, Christopher

Soressi, Marie [169] see Rendu, William

Sorset, Scott [124] see Rees, Mark

Sosa, David (California State University, Los Angeles), Nicolas P. Jew (University of Oregon) and René L. Vellanoweth (California State University, Los Angeles)

[376] *A Study on Trade and Behavior through the Analysis of Exotic Lithic Debitage and Artifacts at the Tule Creek Site (CA-SNI-25), San Nicolas Island, California.*

This study examines lithic debitage and artifacts on exotic raw materials from the Tule Creek Village (CA-SNI-25), a late Holocene site (3500 cal BP to the Mission Era) and one of the last occupied villages (500 BC–AD 1700) on San Nicolas Island. In contrast to the shell bead trade off the island, little is known about what materials were brought to the island. Excavations yielded over 100 lithic artifacts from two significant components at CA-SNI-25 with the majority consisting of imported obsidian, chert, and soapstone. In this study, we compare the attributes of the lithic debitage to the formal artifacts made on nonlocal raw materials found at the site. Results suggest that the Nicoleño acquired finished artifacts as part of a large and intricate trade network.

Soto, Gabriella (University of Arizona)

[188] *Microhistories of the "Funnel Effect": Tracing the Banal Materialities of U.S. Border Enforcement, 2000–Present*

Nearly two decades have passed since the strategic border security paradigm known as "prevention through deterrence" took root in the landscape of Southern Arizona. The aim is to deter illicit migration by strategically amassing border security forces to funnel migrants into a treacherous landscape of increased risk. Thousands of undocumented migrants have died when confronting those risks in an outcome known as the "funnel effect." This paper draws upon dissertation research that studied the local and microhistories of the funnel effect using ethnoarchaeological methods and GIS technology. This work ultimately reveals the limits of state control of people and landscapes. Networks of migrants' spiderwebbed clandestine trails exhibit a history of changing but repeat use, all while the state's tools and spending to control the border have continued to amass. Similarly, one can trace the institutionalization of migrant "trash" cleanup by Arizona land managers, and the trend of migrants endeavoring to leave no material trace. Motivating this work are applied questions about the effectiveness of state-based aims to control the border, and theoretical questions pertaining to the role of contemporary archaeology to understand the banal material realities of state-based power in dialectical engagement with the collective effects of informal survival strategies.

Soto, Selena

[304] *On the Road Again*

National parks and their cultural identities have changed their meanings to visitors throughout time. The significance of national parks in the United States to visitors during the nineteenth and twentieth centuries was to experience the nation's heritage, admire natural resources, and/or gain monetary value. One method in understanding past visitors' behaviors and how they viewed the significance of national parks is to analyze historic roads. Roads help determine the most frequented places whether for tourism, travel, and/or trade. One national park specifically, Petrified Forest National Park, exhibits these behaviors due to its historic background of having roads for a mail route, guided tours from nearby towns, and for being one of the only national parks to have Historic Route 66 preserved within it. With the amount of history that is found within Petrified Forest National Park, I used Google Earth Pro to map historic roads within the national park and utilized previous site assessments to confirm the dates and purpose of the roads. By

examining the historic roads found within Petrified Forest National Park, I determined the significance the park held for past visitors and how its identity has changed throughout time.

Soto Maguino, Jorge Luis [331] see Lofaro, Ellen

Soulier, Marie Cecile [169] see Rendu, William

Soza, Danielle

[89] *Clovis to San Pedro: Projectile Points and Land Use in the Southern Colorado Plateau*

Recent research done by the University of Arizona at Rock Art Ranch, located on the southern Colorado Plateau near Winslow, Arizona, yielded a wealth of information on preceramic land use in an area where prior research had not been conducted. Survey of a 6-square-mile area recovered more than 140 projectile points ranging from Clovis to San Pedro, 50 bifaces, and 88 sites. Multiple canyons crosscutting the ranch carry water that results in a diverse range of flora and attracted animals to the area. Additionally, cobble accumulations in two areas along Chevelon Canyon, where over 3,000 preceramic petroglyphs have been carved, provided local populations with ample lithic raw material. This poster looks at these resources to understand their role in explaining extensive use of the study area for over 10,000 years. Samples of raw material from the local quarries will be compared to the materials used in the manufacture of the preceramic projectile points and bifaces to determine local and nonlocal procurement. This research will add new data to prior studies to provide an understanding of the broader patterns of land use and social interactions of the mobile occupants of this region.

Spake, Laure [86] see Cardoso, Hugo

Sparaga, Joseph, Sarah K. Campbell (Western Washington University) and Laura Phillips (Burke Museum of Natural History and Culture)

[228] *Specialization, Standardization, and Opportunism: A Design Theory Perspective on the Production of Cultural Necessities at Tse-whit-zen Village*

Lithic artifacts recovered from the Tse-whit-zen village, a large settlement on the coast of the Strait of Juan de Fuca inhabited for 2,800 years, assist in portraying the choices made by people for adapting to the surrounding environment through tool development. Analysis of the lithic assemblage is based on a design theory approach that addresses material selection and reductive manufacturing strategies to understand efficiency, expediency, and reliability in forming the end products. The assemblage is dominated by fabricating tools such as flakes, anvils, hammerstones, and abraders. Mobiliary art in the form of stones with incised designs occur in significant numbers, while tools specific to food procurement such as projectile points, net weights, and fishhook shanks constitute a very small percentage. In contrast, manufactured bone items are almost entirely specialized, standardized components for fishing gear. Cutting, engraving and incising tools were required to produce both the bone tools and the socially significant incised stones but high quality flaking material is not common in the area. Rather than importing exotic material, the artisans developed techniques for producing reliable, standardized cutting tools such as quartz crystal microtools and large spall flake tools from local materials that were less than optimal.

Sparks, Shane (ICF International), J. Tait Elder (ICF International), Mathew Sisneros (ICF International) and Melissa Cascella (ICF International)

[194] *Buried Archaeological Sensitivity Modeling in the Pacific Northwest*

ICF assisted the Washington State Department of Transportation (WSDOT) with the preparation of a buried archaeological sensitivity model in support of a client-sponsored research project in Seattle, Washington. ICF approached the model development from a statewide scale and employed geologic landform type and soil age as main model inputs. Surface geology data was not available at a large enough scale to support the entire effort so ICF combined national resource conservation soil data attributed with soil parent material with surface geology units at a scale of less than 1:100,000 to cover soil data gaps. After statewide data coverage was achieved, landform and parent material types were normalized based on geomorphic origin, and then assigned to a target geologic epoch (Holocene or Pleistocene and older). ICF then tested this model with 200 previously recorded archaeological site locations. This presentation presents the methods and results used to develop and test this model, and discusses the potential of this model to be an efficient and practical modeling approach for modeling buried archaeological sensitivity across larger regional areas.

Sparrow, Leona [17] see Rowley, Susan

Speakman, Robert J. [4] see Cooper, H. Kory

Spearing, Whitney [100] see Grieve, Johnathan

Spears, Michael (University of Arizona) and Damian Garcia (Pueblo of Acoma)

[366] *A Case Study of Engaged Archaeology within Graduate Education*

This poster presents a collaborative archaeological project between the Pueblo of Acoma Historic Preservation Office (HPO) and the University of Arizona, School of Anthropology. The project began as an internship that fulfilled a requirement of the Applied Archaeology MA program. The internship was designed to better understand the Tribal Historic Preservation Program in residence at the Pueblo of Acoma, while providing professional archaeological assistance to the HPO by compiling a database of archaeological sites that may be impacted by an upcoming infrastructure project in the San Juan Basin. This database will be used to inform an upcoming ethnographic study of the project area. The internship quickly morphed into an ongoing collaboration that is assisting the HPO in developing a program plan for submittal to the NPS to become a federally recognized THPO, and a comprehensive preservation plan that the HPO will use to frame their goals and objectives. This results of this ongoing project are being compiled as a Masters Report. This project is an example of a mutually beneficial collaborative project and demonstrates an engaged archaeological approach within graduate education.

Speck, Wedlidi [46] see Muir, Robert

Speer, Charles (Idaho State University)

[91] *Knapping Precise Porcelain Replicas*

The experimental replication of lithic artifacts commonly encounters issues of standardization and control. Two major issues are how to accurately sample a population and how to sample from specific stages over the flaking process. Knappable stone is unpredictable due to inclusions, cracks, and differences in size, texture, and fracture toughness. It is necessary to create knappable facsimiles of either artifacts or knapped replicas by experts at specific stages. This allows for observation of specific behaviors at critical stages in the production process; such as notching, fluting, pressure flaking, or late stage bifacial thinning. A new method is presented that provides several advantages over traditional approaches to flintknapping experiments: flaking of precise facsimiles of actual artifacts, recording and replication of critical stages in the reduction process, and the production of a large number of these precise replicas at a relatively low cost. The method presented here uses a micro-CT scanner to record the artifact form, a Fused Deposition Modeling 3D printer to produce a copy of the artifact form, a plaster mold of the printed artifact form, and then lastly casting, production, and firing of the artifact form in the plaster mold from porcelain slip.

Speller, Camilla (Department of Archaeology, University of York)

[378] *Molecular Solutions for the Taxonomic Identification of Archaeological Whale Remains*

Several large cetaceans appear on the IUCN Red List, and in most cases their endangered status is considered to be the result of relatively recent industrial overhunting. Archaeological studies, however, suggest that preindustrial whaling as well as climatic fluctuations may have had a significant impact on whale behavior and ecology. Documenting the impact of natural and anthropogenic factors within the archaeological records is difficult because whales are big and their bones are friable. The larger the whale, the less bone is transported from shore to settlement, decreasing the likelihood of finding diagnostic pieces of the skeleton, and identifying either the species or number of animals present. A variety of molecular methods are now available identifying the taxonomy of highly fragmented remains, including collagen peptide mass fingerprinting (ZooMS), mitochondrial DNA barcoding, and whole genome sequencing. Through a case study focused on the Mediterranean, we discuss the relative advantages and limitations of these molecular techniques, and highlight the importance of molecular identifications in reconstructing former cetacean species distributions and behavior.

[378] *Chair*

Speller, Camilla [50] see Yang, Dongya

Spenard, Jon (Cal State University San Marcos), Michael Mirro (Applied Earthworks), Jennifer Weber (Rheinische Friedrich-Wilhelms-Universität Bonn) and Terry Powis (Kennesaw State University)

[386] *Digital Documentation of Ancient Ritual Landmarks: Modeling Senses of Place with Photogrammetry, Lidar, and Virtual Tours*

Ritual karstscape archaeological research at the prehispanic Maya site of Pacbitun, Belize, by the Pacbitun Regional Archaeological Project (PRAP) has included experimentation with a range of digital recording technologies. The overall goal of these experiments has been to better document ritual landmarks and the archaeological materials within them than has been possible with traditional recordation methods such as hand-drawn maps, photographs, and written descriptions. Our efforts have centered on three-dimensional digital photographic modeling (photogrammetry) in a variety of contexts, including landmark mapping, unit and archaeological feature modeling, and recording a rock art panel. We have also experimented with terrestrial laser scanning (TLS) for landmark mapping and modeling. In this presentation, we discuss the benefits and the frustrations we experienced using these technologies, discuss avenues for moving forward with them, and offer some preliminary interpretations of the archaeological data we collected with them over the past several field seasons. We will also demonstrate the ease with which cave archaeologists can use some of these technologies, in conjunction with inexpensive immersive three-dimensional digital viewers to convey the grandeur of the places we investigate and make them broadly accessible to interested audiences.

Spenard, Jon [5] see Powis, Terry

Spence-Morrow, Giles (University of Toronto)

[272] *Memento Mori: Scalar Reference, Architectonic Persistence and the Continuity of Ritual Memory at Huaca Colorada, Jequetepeque Valley, Peru*

This paper examines the temporal dimensions underwriting relationships linking humans, architectural representations and the meaningful places they reference in past Andean life-worlds. I argue that for the Moche of the North Coast of Peru, acts of symbolic compression and miniaturization served to reanimate specific times, known ceremonial locales, and the social identities created and reaffirmed in these places. The ritual efficacy of architectural simulacra rests in their mimetic power to condense and transfer the potency of ritually charged spaces and their human and other-than-human attendants across time. I interpret the numerous scalar representations of ceremonial spaces ubiquitous to the Moche ceramic corpus as playing an important role in rites of death and renewal as well as serving as chronometric markers of temporal breaks. However, a comparison of such representations in relation to a remarkable sequence of ritualized reconstructions of architecture found at the Late Moche site of Huaca Colorada (AD 650–800) in the Jequetepeque Valley reveals that they served much more than as passive mementos of deceased leaders and revered places. Instead they condensed latent temporal or generative energy that at once stored but could potentially reanimate ritually charged landscapes as active timescapes throughout the phases of their occupation.

Spence-Morrow, Giles [233] see Gonzalez-Macqueen, Felipe

Spencer, Kaylee [204] see Werness-Rude, Maline

Spencer, Charles

[278] *Evolution of Elite Residence at San Martín Tilcajete, 500–100 BC*

Between 1995 and 2014, we directed 11 seasons of horizontal excavation in and around the main plazas of two Formative Period sites, El Mogote and El Palenque, near San Martín Tilcajete in the Oaxaca Valley. Our results indicate that major changes occurred in public architecture and elite residence between the Early Monte Albán I phase (500–300 BC) occupation at El Mogote and the Late Monte Albán I phase (300–100 BC) site of El Palenque. In view of the evidence of fundamental cultural continuity between the two sites, we submit that the observed changes represent a case of “descent with modification,” amenable to analysis and interpretation from an evolutionary perspective. We argue that the data reveal a major increase in the centralization and segregation of political and religious institutions between the Early Monte Albán I and Late Monte Albán I phases. Of particular relevance to this symposium is our discovery at El Palenque of a 1,700 m² palace complex, comprising both residential and governmental components, as well as a 5,000 m² temple precinct, containing three multiroom temples associated with two specialized priests’ residences; these architectural forms made their first appearance in the Late Monte Albán I phase.

[278] Chair

Spencer-Wood, Suzanne (Oakland University and Harvard University)**[74]** *Intersectional Feminist Theory and Materializations of Diverse Plural, Fluid, Multivalent, Intersectional Gender Identities in the Historic Jewish Diaspora on Greater Boston's Landscape*

Intersectional feminist theory was introduced in the 1980s as an African-American critique of structural feminist theories that universalized white middle-class women's experiences of patriarchy. Language shifted from interactions to intersections of gender systems with an expanding set of social structures, from race to class, ethnicity, religion, etc. These intersections became the basis for research on plural, fluid and multivalent identities. Intersectional feminist theory focuses on gender and sexuality because they are primary social structures central to constructions of self and identity by children, women and men. By the age of two children develop a clear gender identity, but they do not usually develop an awareness of race, ethnicity, or class differences until later. I have researched how Boston's diaspora of diverse Jewish communities materialized their plural, fluid and multivalent gender identities at intersections with ethnicity, class, and religious sects. New types of sites, and spaces and furnishings in synagogues changed as congregations fluidly moved back and forth along the continuum between orthodox and reform Judaism, adopted some gendered aspects of Protestantism, moved up the class ladder from poverty into the middle class, and changed from being viewed as an inferior race to being considered white by Anglo-Americans.

Spengler, Robert (Institute for the Study of the Ancient World, New York University)**[27]** *Evidence for Dung Burning in the Archaeobotanical Record of Central Asia*

In the early 1980s Naomi Miller changed the way paleoethnobotanists in several parts of the world approached the interpretation of their data. With her research into whether the ancient seed eaters of southwest Asia were human or herbivore, she opened an ongoing debate over what impact the burning of animal dung had on archaeobotanical assemblages and how researchers can differentiate between human and animal food remains. As the number of systematic paleoethnobotanical studies across Central Asia increase, we are continually confronted with the topic of dung burning. Herd animal dung is the dominant fuel source across much of Central Asia today and the high densities of wild seeds in archaeobotanical assemblages seem to suggest that people were using dung as fuel across Inner Asia for millennia. Seed assemblages that represent herd animal dung are helping scholars in Central Asia understand paleoecology and herd animal diet in the past.

Spengler, Robert [388] see Ryabogina, Natalia

Spielmann, Katherine (Arizona State University)**[61]** *Discussant*

Spielmann, Katherine [129] see Strawhacker, Colleen

Spindler, Luke (University of York), Krista McGrath (University of York), Matthew Collins (University of York) and Penelope Walton Rogers (Anglo-Saxon Laboratory)**[96]** *A Method to Extract Collagen from Archaeological Leather for Species Identification with ZooMS*

Zooarchaeology by Mass Spectrometry (ZooMS) is a rapid peptide fingerprinting technique capable of identifying species provenance in several archaeological materials of biological origin, and most commonly used on bone. Leather has proven resistant to analysis not only by ZooMS, but also to DNA extraction due to the tannins that are present in the material. We have used alkali (NaOH) to increase the solubility of the tannins and thereby extract them before enzyme digestion. This has allowed us to make several species identifications on samples of archaeological leather in varying different states of decay and mineralization. The ability to identify leather opens up the possibility of a larger study exploring the production and use of a wide range of leather artifacts. Developing this method could provide advantages over visual examination of folicle patterns where these have been destroyed by the manufacturing process or degradation, and where even with good visual evidence two species are difficult to distinguish from one another (e.g., sheep and goat).

Splitstoser, Jeffrey (George Washington University)**[316]** *Wari-Style Khipus from El Castillo de Huarmey*

Archaeological evidence suggests that khipus—devices made of wrapped and knotted cords—were used by people living in the Wari Empire at least as early as Middle Horizon 1B. These Wari-style khipus, like their later, more famous, Inka descendants, likely carried and conveyed information using color and knots. Wari khipus differ from Inka khipus, however, in many respects including their use of colorful wrapping to make bands and patterns to convey information. Wari-style khipus survive in far smaller numbers than their Inka counterparts. In fact, until 2013, the total number of Wari-style khipus known to be in museums and private collections throughout the world was less than thirty, but excavations conducted between 2013 and 2016 by Milosz Giersz and Roberto Pimentel at the site of Castillo de Huarmey changed all of this when they uncovered the largest number of scientifically excavated Wari-style khipus ever found: approximately fourteen khipus and khipu fragments, many from undisturbed contexts. Some of these khipus are nearly complete; others are remnants, consisting of single cords to multi-cord assemblages that include pendants and subsidiaries. This talk will detail this important find, presenting the entire collection for the first time with its archaeological associations and contexts.

[60] *Discussant*

Splitstoser, Jeffrey [60] see Vail, Gabrielle

Spores, Ronald and Laura Diego Luna (Institucional de Antropología e Historia, México)**[217]** *Power and Settlement in Prehispanic and Early Spanish Colonial Yucundaa-Pueblo Viejo de Teposcolula, Oaxaca*

Yucundaa-Pueblo Viejo de Teposcolula, Oaxaca, Mexico, is the urban capital and power center of a Prehispanic and Early Colonial Mixtec state, occupying 4 km² from AD 1000 to 1550. This research utilizes a convergent archaeological, ethnohistoric, and biological methodology, and focuses on the evolution and transformation of the city and its surroundings until the time of its relocation to the adjacent lowlands in 1550. Of particular concern was identification and analysis of structures and infrastructure pertaining to major social classes, political institutions, and ritual activities as they evolved from Prehispanic to Spanish Colonial times. What were originally conceived as separable residential, administrative and civic-ceremonial elements ("palace," tecpan, tecpancalli, anafie or yuhuitau, plaza, mounds, platforms, courts, patios, etc.) through data collected from intensive excavations, survey, and ethnohistorical and biological studies, were determined to be functional components of an integrated urban-political urban capital and should

be properly treated as such. This report considers those findings and conclusions and provides recommendations relating to research in the Mixteca, Oaxaca, and in other regions of Mesoamerica-New Spain with reference to the grand transformations taking place in the area before and after the Spanish Conquest.

Sportman, Sarah P. (Archaeological and Historical Services, Inc.) and David Leslie (Archaeological and Historical Services, Inc.)

[199] *Underwater, Terrestrial, and Intertidal Core Extractions at the Walk Bridge, Norwalk, Connecticut: an Alternative to Traditional Phase I Survey*

The CTDOT Walk Bridge Replacement Project in Norwalk, Connecticut presented several challenges, making it unsuitable for a traditional Phase I archaeological survey. The urbanized Area of Potential Effect (APE) has been heavily industrialized since the mid-nineteenth century. The pervasive ground disturbance, land making, and hazardous soil contamination that characterize the APE presented obstacles to typical survey methods such as hand-excavated shovel test pits. Documentary research identified several areas of potential archaeological sensitivity in the APE, including the possible location of a Late Woodland Native American fort. To overcome these obstacles and better assess the archaeological potential of sensitive portions of the APE, AHS chose to employ a testing strategy that combined terrestrial geoprobes, underwater vibracores, and intertidal push-cores. This sampling strategy allowed AHS to evaluate the presence of and/or potential for intact soils and subsurface cultural materials; to collect data to reconstruct local paleogeography and paleogeomorphology, evaluate depositional environments, and record changes in historic-period land use; and to provide recommendations for further investigations or mitigation based on an overall assessment of underground and underwater archaeological potential within the APE. Underwater, intertidal, and terrestrial core extractions provided AHS with cost-effective and information rich alternatives to traditional survey strategies.

Sportman, Sarah P. [16] see Ranslow, Mandy

Spriggs, Matthew

[32] *Different but Similar? Colonization Processes on Islands and Continents Compared*

As discussed elsewhere (Spriggs 2008) the 'islands as laboratories' trope can be overblown, and factors beyond size, circumscription and vulnerability have to be taken into consideration. Indeed none of these are concerns uniquely limited to islands. In this paper I stress too that colonization on its own may be too limited a concern. We need to examine longer archaeological sequences for a truly comparative archaeology, where what happens after initial colonization is also key to understanding. I compare aspects of the Lapita colonization and its aftermath in the Southwest Pacific islands, the Linearbandkeramik and Cardial Ware cultures of Continental Europe and the Mediterranean coastline, and the Neolithic spread across Mainland Southeast Asia to show that islands are not always what they are cracked up to be.

[133] *Discussant*

Spring, Adam [386] see Griffith, Cameron S.

Springate, Megan (University of Maryland)

[318] *Leading Each Other to Water: Queer Archaeology and Consciousness Raising in New York's Adirondacks*

In 1903, white middle-class women founded Wiawaka Holiday House in New York State's Adirondack Mountains for "working girls" to have an affordable vacation away from unhealthy factories and cities. In 2013 and 2014, I and dozens of community volunteers (ages 18 to 70) excavated on the grounds of the still-operating Wiawaka Holiday House (now the Wiawaka Center for Women). Underpinning all of the conversations and instruction about interpretation and excavation at the site were the queer archaeological approaches of challenging assumptions and recognizing the deeply intersectional nature of identity. For many participants, the idea of identities not being fixed characteristics was transformative, and they readily engaged with examining how gender, class, and race were (and continue to be) created and enforced, often using their own life histories as examples. In this paper, I discuss how the project was structured to facilitate these conversations; give examples of how participants (and myself) were changed by the experience; and present how the excavations at Wiawaka continue to challenge the status quo.

Springer, Chris (Simon Fraser University)

[334] *Houses, Territory, and Tenure: An Archaeological Case Study of Territoriality in the Salish Sea*

The multifamily, above-ground, post-and-beam plankhouse looms large in our understanding of ancestral Coast Salish households that populated the coastal regions of southwestern British Columbia and northwestern Washington State. In addition to their practical role as shelters, plankhouses were both social fields of daily practice and ceremonialism, and imposing physical structures that communicated presence and the territorial and tenorial interests of the household. In this presentation, I examine the purported adoption of this house type over other architectural forms (e.g., in-ground houses) as the primary dwelling circa 2400–2000 years BP among the coastal populations of the Salish Sea. Drawing on Coast Salish structuring principles of bilateral kinship and group exogamy in conjunction with cultural values associated with autonomy and collectivism, I argue that an increasing territoriality in the region necessitated previously dispersed families aggregating into larger, mutually beneficial collectives that were best served by the modular design of the above-ground plankhouse.

Squires, Kirsty (Staffordshire University)

[139] *Time to Take a Rain Check? The Social and Practical Implications of Weather and Seasonality on the Cremation Rite in Early Anglo-Saxon England*

Cremation was one of the primary funerary rites employed in early Anglo-Saxon England (fifth to seventh century AD). Open-air pyres were used to cremate the dead alongside an array of pyre goods, including personal objects and faunal gifts. The resultant remains were subsequently collected and interred in pottery urns. Despite the fact that this mortuary rite has been subjected to extensive research over recent years, archaeologists often overlook the challenges faced by communities that practiced cremation during this period. Weather and seasonality would have undoubtedly played a major role in the success of an open-air cremation. This paper will explore how early Anglo-Saxon communities dealt with fatalities during winter months and periods of inclement weather. The effects of a death under these circumstances would have impacted populations on a household and communal level. Funeral preparations, interactions between the living, and post-mortem treatment of the dead will each be considered as a means of establishing how communities overcame periods of adversity. An examination of the hardships faced by cremation practicing groups on both a practical and social level can further illuminate how the living interacted, not only with each other, but with the dead in early Anglo-Saxon England.

St. Amand, Ani (University of Maine Climate Change Institute), Daniel H. Sandweiss (University of Maine) and Alice R. Kelley (University of Maine)

[359] Aeolian Geoforming at a Preceramic Mound in Coastal Peru

Los Morteros is a preceramic mound located on the North Coast of Peru composed of anthropogenic structures interlayered with aeolian deposits. A study combining multidisciplinary approaches and methodologies was used to evaluate the hypothesis of mound construction through intentional aeolian sand deposition via manipulation of strong winds across the desert environment. Wind velocities were measured across the site and in the surrounding valley. A complex wind model was created utilizing these data, as well as recent large-scale digital elevation models (DEMs), Landsat 8 satellite imagery, and a high-resolution GPS-derived DEM. Previous ground-penetrating radar (GPR) data were used to distinguish structures, such as walls and flagstone floors, and individual sand units. This research explores the relationship among periods of construction, occupation, and sand inundation at Los Morteros, and examines the probability of human management of wind-driven sand accumulation patterns to intentionally bury preexisting structures and thus increase mound size. Satellite images and ground exploration were also used to examine the relationship between wind and other constructed features across the valley. This approach enables a semi-automated land classification process capable of identifying sites similar to Los Morteros that may lie hidden beneath the large coastal dunes of the region.

St. John, Amy (Western University)**[258] Micro Computed Tomography in Archaeological Ceramic Studies: A Case Study on Ontario Late Woodland Borderlands**

The use of Micro Computed Tomography (CT) in archaeological science is a burgeoning field of research which has the potential to transform the ways in which we conduct materials based studies. This technology is only beginning to be used in archaeological ceramic analysis. Since micro CT uses X-rays to provide nondestructive 3D images of the interior and exterior of ceramics, it can isolate features in clay such as temper, inclusions, voids and micro-folds in a unique way. As such, it has great potential to augment traditional techniques when examining ceramic technology. This poster presents the results of ongoing research on one of the first large scale applications of this innovative, nondestructive technique. To examine the potential of micro CT, I scanned and conducted detailed image analysis on more than 50 rim sherds from a series of contemporaneous and sequentially occupied sites (ca. AD 1100–1250) from a borderlands area between the archaeological Western Basin and Ontario Iroquoian traditions. The ability of micro CT scanning to identify and visually display idiosyncratic artisan practices through 3D interior ceramic features offers promise to better understand what has been long recognized as the critical, individualistic dimensions of making pots.

Stackelbeck, Kary (University of Oklahoma)**[163] Exploring Different Facets of Early Hunter-Gatherer Interaction in Selected Ecotonal Boundary Areas of North and South America**

This paper examines the influence of Richard Jefferies's research into early hunter-gatherer interaction on my own work in the mid-Continental United States and Central Andes. The material expressions of social interaction among terminal Pleistocene to mid-Holocene populations in these disparate regions vary substantially. However, interesting observations may be made when placing those expressions in a broader context of understanding the ways in which early populations navigated their social and physical environments—particularly during times of substantial climatic change and in geographical areas that represented some type of boundary zone.

[206] Discussant

Stafford, Thomas, Jr. [227] see Oliver, James

Stafford, Thomas, Jr. [367] see Shillito, Lisa-Marie

Stahl, Ann (University of Victoria)**[327] Discussant****Stahl, Peter W. (University of Victoria), Josefina Vásquez Pazmiño (Universidad San Francisco de Quito) and Florencio Delgado Espinoza (Universidad San Francisco de Quito)****[384] Shamans, Jaguars, Owls, Cosmograms, and Zygotes: Matapalo and the Origins of Late Valdivia Stone Plaques**

The material record of Ecuador's Early Formative Valdivia culture has long been approached from the perspective of a New World, particularly an Amazonian, shamanism incorporating foundational features of animistic ontology. More recently enigmatic stone plaques from Northern Manabí Province have been included in the non-secular repertoire of later Valdivia phases; however, their temporal and spatial associations remained poorly known. Investigations in the Coaque Valley clearly establish their association with a Late Valdivia Piquigua phase occupation at the site of Matapalo, located at the base of the towering Pata de Pájaro, which was the source of material used in their manufacture.

Stahl, Peter W. [270] see Astudillo, Fernando J.

Stanchly, Norbert (AS&G Archaeological Consulting), Stephanie R. Orsini (Coastal Environments Inc. and Moore Archaeological C) and Marcus England (Bloom Biological Inc.)**[340] Assessing Human-Animal Interactions in Mesoamerica: Ancient Maya Use of the Black-Throated Bobwhite (*Colinus nigrogularis*)**

This paper examines human-animal interaction between the ancient Maya and the black-throated bobwhite (*Colinus nigrogularis*), a small quail resident to Central America. We provide a literature review of the occurrence of bobwhite remains in Maya faunal assemblages. Unpublished faunal analyses by the primary author, in conjunction with the published literature, suggest that the bobwhite, like many animals in Mesoamerica, was of greater importance to the Maya than as a mere dietary food. We examine its social, political and economic importance to the Maya and explore several forms of interaction such as wild or captive management or rearing of the bird. Finally, the paper will suggest avenues of future research to help reconstruct and elucidate its function within ancient Maya society.

Stanchly, Norbert [7] see Wisner, Gavin

Stanco, Alyxandra (Louisiana State University)**[364] Osteoarthritis and Implications for Economic Lifestyle Change in Two Prehistoric Skeletal Populations**

Numerous studies have been conducted regarding the influence of activity-related stress on postcranial elements such as the upper and lower limbs, but few studies have considered the vertebral column in relation to interpopulational variation. This study examined the vertebral columns of two prehistoric skeletal populations. The Indian Knoll site (n = 98), representing a population of hunter-gatherers, is located in Ohio County, Kentucky along the Green

River and is dated between 2558 and 4160 BC. The Moundville site (n = 56), a chiefdom of early agriculturalists, is located in the Black Warrior River Valley in west-central Alabama and is dated between AD 1050 and 1520. Data were collected on type and location of pathologies to determine if economic lifestyle is associated with interpopulational differences in vertebral pathologies. Vertebrae were scored from 0–3 based on severity of osteoarthritic development. Results show that Indian Knoll had higher prevalence of osteoarthritis when compared with Moundville. Additionally, osteoarthritis was more frequent in the lumbar region followed by thoracic and cervical. Results indicate a relationship between changes in economic lifestyle and development of vertebral pathologies.

Standen, Naomi [25] see Wright, Joshua

Stang, Michaela [339] see Rice, Sally

Stanish, Charles [308] see Tantaleán, Henry

Stanley, Brendan (Texas State University)

[3] *Olmec of the Periphery: The Dawning of Creation in the Central Mexican Highlands during the Middle Formative*

By 900 BCE, a middle formative Olmec influence projected into the central highlands of Mexico. This became apparent with the 1930s discovery of the regional center of Chalcatzingo and its monumental architecture created in the Olmec style. Additionally, Olmec style symbolism appeared in the modern Mexican state of Guerrero with outstanding examples like the monumental architecture of Teopantecauitlan and the cave paintings of Oxtotitlan and Juxtaluaca. This paper will iconographically analyze the four aforementioned middle formative periphery centers, whose Olmec style architecture, bas-reliefs, and cave paintings link this highland region back to the Olmec heartland. On the one hand, my hypothesis is that these periphery centers incorporate heartland symbolism and ideology to validate and link their elites to those of Olman. At the same time, the same symbolism displayed at the four sites can be linked thematically, showing a unique cultural florescence within this highland periphery. Thematically, the highland symbolism relates to greater Mesoamerican cosmology and, specifically, the belief of the dawning of creation. This paper will attempt to further develop the scholarship of this formative cultural region, arguing that a similar symbolic sequence, or tableaux, illuminates a highland cosmology that incorporates middle formative symbolism of Olman.

Stansell, Ann (CSUN)

[98] *Commemoration in the Wake of Catastrophe: A Historical Archaeology Investigation of Southern California's St. Francis Dam Disaster and its Victims*

The commemoration of disasters and their victims is a product of cultural, economic, political, and social forces in human society. Southern California's largely forgotten St. Francis Dam Disaster of 1928 provides an excellent opportunity to study this complex process of commemoration, engaging memory within different frames of reference. Previous scholarship related to the disaster has been focused within the fields of civil engineering and geology, with the singular goal of determining the cause of the dam's collapse; little, if any attention has been given to the 400 victims or how they have been memorialized. Evaluating how and why this catastrophe has been forgotten on a state and national level, but tenuously remembered within the flood zone, allows for consideration of the diversity of commemorative processes in the construction of memory and heritage related to major catastrophes and can help reveal the spatial and temporal scales of memorialization efforts. This investigation synthesizes archival research, Internet resources, and archaeological survey data to discern how the disaster and its victims have been commemorated through state monuments, community memorials, grave markers, museum exhibits, and memorabilia and the legacy of their memory.

Stansell, Ann [98] see Snead, James

Stantis, Christina, Hallie Buckley (University of Otago), Amy S. Commendador (Idaho Museum of Natural History) and John Dudgeon (Idaho State University)

[123] *Using Stable Isotopes to Identify Childhood and Infant Feeding Practices in Prehistoric Taumako*

Though many ethnohistoric sources in the tropical Pacific recount chiefly feasting events, few describe the feeding practices of children despite the impact childhood nutrition has on morbidity and mortality throughout an individual's life history. The Namu burial ground (circa 750–300 BP) on the island of Taumako in the southeast Solomon Islands provides a direct means of understanding prehistoric life on a Polynesian Outlier. Twenty individuals from the 226 excavated were sampled as part of a pilot study. We investigate infant and childhood feeding behavior in prehistoric Taumako by creating $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ profiles using collagen horizontal dentin sections of permanent molars. The high-resolution data in those individuals who survived to adulthood is supplemented with skeletal evidence of nutritional disease and grave goods suggesting relative wealth to create a combined approach and offer insight into breastfeeding and weaning practices in the absence of documentary evidence.

Stanton, Travis (University of California Riverside), Aline Magnoni (American Association for the Advancement of Science), Jessica Wheeler (Tulane University) and Nicolas Barth (University of California Riverside)

[329] *Using Lidar and Ground Survey to Understand Regional Settlement Patterns in Terminal Classic Central Yucatán*

The first research performed by the Proyecto de Interacción Política del Centro de Yucatán centered on understanding the impact of Chichén Itzá in the region to the southwest of this Terminal Classic city. Working in an area of roughly 500 km² around the site of Yaxuna we performed traditional ground reconnaissance and mapping at numerous centers in the region from 2007 to 2013 to better understand regional settlement patterns and how they changed with the establishment and growth of the Itzae center. In 2014, we conducted a lidar survey of a 48 km² area that included Chichén Itzá, Yaxuna, and a 1 km wide transect between the two sites. In this paper we report on the results of this survey, as well as an intensive ground-truthing sample along the transect between the sites of Yaxuna and Popola. The combined data suggest that rural settlement decreased when Chichén Itzá was urban leaving primarily scattered small hamlets throughout most of the region.

Stanton, Travis [179] see Perkins, Leslie

Stanyard, Zachary (Western State Colorado University), Torin Power (Western State Colorado University), Nathan Hayman (Western State Colorado University), Griffin Larson (Western State Colorado University) and David M. Hyde (Western State Colorado University)

[11] *Excavations at Group F of the Medicinal Trail Community in Northwest Belize and Its Implications for Agricultural Processing*

Excavations of a circular depression and adjacent mounds at Group F have revealed functional data to support the hypothesis that this area was used as a processing center for agricultural material. The evidence stems from excavation of the depression itself, as well as two chich mounds on the northwest and northeast sides. The limestone bedrock of the depression appears to have been manually shaped for use, as indicated by cobble fill found roughly a meter down in an excavation trench bisecting the depression. The two chich mounds appear to have no uniform structure to them and appear to be used as debris piles related to field clearing. This paper will aim to analyze the evidence uncovered and perform an interpretive analysis of the data presented at Group F during the 2015 and 2016 field seasons and to assess the probability of agricultural activity taking place.

Stark, Barbara (Arizona State Univ)

[82] *Discussant*

Stark, Miriam

[271] *Khmer Stoneware Ceramic Production and the Angkorian State*

The Angkorian Khmer (900–1500 CE) manufactured an array of goods that materialized and celebrated political authority, from temples and religious statuary to ornaments and domestic tools. Khmer stoneware ceramics were one of the least spectacular and most ubiquitous of these, yet their distributional pattern deftly maps the geography of ninth–fifteenth century Angkorian rule. Archaeological research at Khmer stoneware kiln sites in the last two decades, coupled with excavations in Greater Angkor, have resulted in a growing database of production centers and a better understanding of the range of stonewares produced. Our paper presents morphological and geochemical results from eight Cambodian stoneware kiln complexes. Examining kiln design and geochemical variability, evident at different scales, allows us to better problematize and contextualize the relationship between stoneware production and the state.

[214] *Discussant*

Starkovich, Britt (University of Tübingen), Paraskevi Elefanti (M.H. Wiener Laboratory for Archaeological Science) and Eleni Panagopoulou (Ephoreia of Paleoanthropology of Southern Greece)

[169] *Spatial Differences in Site Use at the Middle Paleolithic site of Lakonis (Peloponnese, Greece)*

Lakonis is a Middle Paleolithic rockshelter on the coast of the Mani Peninsula of southern Greece. It is well-known for the preservation of a Neanderthal tooth in the late Middle Paleolithic layers, which is one of the few Pleistocene hominin remains from Greece. The site preserves several occupation areas spanning 120,000–40,000 BP. Lithic and faunal remains are abundant, though the faunas are highly fragmented due to heavy concretion of the sediments. During excavation, researchers defined at least three distinctive areas of the site: a rich hearth complex, Upper Bone breccia, and Lower Bone breccia. Analysis of the lithic assemblages suggests a number of key differences between the three contexts. The hearth complex is characterized by small numbers of unspecific artifacts. In contrast, the Upper and Lower Bone breccias are richer and characterized by higher proportions of retouched and broken tools as well as cores, some of which were heavily utilized. Cutmark frequencies and degree of bone burning also differ between the three areas. In this paper, we attempt to define different activity areas across Lakonis by comparing bone taphonomy to differences in the composition and the main technotypological characteristics of the lithic assemblages between the three distinct contexts.

Stastney, Phil (University of Reading)

[168] *Heaps of Time: Methodological Considerations for Dating Earthen Mound Construction*

Establishing a robust chronology is fundamental to consideration of the ritual significance of mounds. This can be as simple as placing a mound or group of mounds into their chronological and cultural context, exploring the chronological relationships between mounds and the pacing of mound construction, through to unpicking sequences of construction, use and reuse of a single mound. Fixing the act, or acts, of “mounding” in time is no less important than fixing them in their place in the landscape. Dating mounds may not be straightforward. There are several important methodological considerations that not only have an impact on the interpretation of dating evidence from earthen mounds but may also impact on our understanding of the ritual and symbolic nature of mounds. The act of mounding involves the collection and redeposition of material that is, by definition, older than the mound itself; whether this is the deliberate remodeling of old material, or merely an accidental side-effect, this raises important considerations. Case studies from a number of morphologically similar but chronologically diverse mounds in England are presented, illustrating the insights as well as the practical and methodological challenges posed by dating large earthen mounds.

Staudigel, Philip [223] see Müller, Peter

Stauffer, J. Grant [283] see Pursell, Corin

Stauffer, John (Washington University in St. Louis)

[283] *Greeting the Dawn: Investigations of Cahokia's East Plaza*

This paper provides an investigation of Cahokia's East plaza and its associated architectural remains. Defined here as the area bounded by Mounds 31, 36, 38 (Monk's Mound), and 51, the plaza was initially distinguished by an absence of surface debris, noted during controlled surface collection efforts in the Ramey Tract by Elizabeth D. Benchley and Barbara J. Vander Leest. Based largely on ceramics that were acquired by these investigators, the proposed time of construction has been placed between the Lohman and early Stirling phases, around the same time as the West, North, and Grand (South) plazas are believed to have been completed. As a relatively early construct that was overshadowed by the rise of Cahokia's other forms of monumental architecture, the area in which the East plaza was established became a palimpsest for the site's pioneering architects. Nevertheless, it comprised an essential component of the site's cosmologically oriented layout. As such, it retained its own architectural nuances and metaphors, some of which are celebrated in our fragmentary understanding of Native oral histories.

Steele, Laura (University of New Mexico), Emily Lena Jones (University of New Mexico) and Jonathan Dombrosky (University of New Mexico)

[251] *Rebound, Stress, Persistence, or Subsistence? The Pre-Pueblo Revolt Fauna from Isleta Mission Convento*

Although the Spanish documentary record from seventeenth century New Mexico describes challenging environmental conditions, faunal analyses from this time and region largely suggest a period of environmental amelioration. However, many of the assemblages that have been used to argue for improved conditions are from indigenous sites. Here, we present data on taxonomic relative abundance from the seventeenth century zooarchaeological assemblage from the Isleta Pueblo Mission Complex, and then use those data to test questions about environmental rebound or, conversely, stress in a Spanish mission environment in the period immediately after Spanish colonization.

Steele, Teresa (UC Davis)**[169]** *Integrating Faunal and Lithic Data to examine Neanderthal Subsistence at the Late Mousterian Site of Abri Peyrony, France*

New excavations at the late Middle Paleolithic site of Abri Peyrony (also Haut de Combe-Capelle) in France yielded rich lithic and faunal assemblages, as well as pieces of manganese dioxide, bone tools, and much needed information about the site's formation and antiquity. The site preserved only Mousterian material, which derives from three main layers of sediments. The site is best known for its Mousterian of Acheulian Tradition (MTA) assemblages, and Level L-3A can be attributed to the MTA. The underlying level L-3B and the upper terrace level U-3 demonstrate similarities to L-3A in blank production but are not MTA. The fauna from the three layers preserve distinct signatures of species diversity: reindeer dominate L-3B, large bovids and red deer form the majority of U-3, and L-3A has a more even species distribution, despite its smaller sample size. Thus, the Abri Peyrony faunal assemblage provides an opportunity to study the relationship between changes in lithic technology and subsistence. When comparing L-3B and U-3, technology appears to be consistent across changing environments, and then both change with L-3A. These results are explored in the context of recent discussions about the relationship between variation in lithic technologies and biostratigraphy in southern France.

[169] *Discussant***[169]** *Chair***Steelman, Karen (Shumla Archaeological Research & Education Center), Jessica DeYoung (University of Central Arkansas) and Carolyn Boyd (Shumla Archaeological Research & Education Center)****[126]** *Archaeological Chemists and Chemical Archaeologists: Working Together in the Lower Pecos Canyonlands, Texas*

This research is a collaboration between chemists and archaeologists to study the ancient mural paintings of the Lower Pecos. Using two independent methods, we are able to provide reliable age estimates for rock paintings. To obtain direct dates, we oxidize organic material in paint layers using plasma oxidation followed by accelerator mass spectrometry radiocarbon dating. For minimum and maximum ages, we isolate calcium oxalate in overlying and underlying accretion layers for combustion and radiocarbon measurement. Direct dates for three paint samples at Eagle Cave are statistically indistinguishable, suggesting the mural was painted as a single composition. In addition, chemical analyses identified rockshelter accretions as well as the mineral pigments used by ancient painters. Methods used include Fourier transform infrared spectroscopy, X-ray diffraction, and portable X-ray fluorescence spectroscopy. The combination of archaeological observations with physical science techniques offers a comprehensive recording methodology. As new high-resolution excavations are underway at Eagle Cave, the rock paintings can now be studied alongside excavated cultural deposits to provide a more complete understanding of this hunter-gatherer society.

Steelman, Karen [392] see Desrochers, Marie

Steeves, Paulette (UMASS Amherst)**[334]** *Indigenous Method and Theory in Archaeology*

Indigenous Archaeology has been described as archaeology with, for, and by Indigenous people. The differences between with and for, and by Indigenous people are critical to Indigenous people and society in general. Research framed in Indigenous method and theory is built within frames of respect, relationality, and reciprocity, it is praxis that weaves through institutional and public spaces to create social change. Such social change addresses the past real world consequences of colonial archaeology and address colonialism in the present. The impacts of colonization, including Eurocentric archaeological discussion of Indigenous communities are best understood through the lived experience of colonized populations. Research framed in Indigenous Method and Theory and carried out by Indigenous scholars and communities is most often, if not always a political act of resistance and rhetorical sovereignty, a reclaiming and reviving of Indigenous ways of knowing, being and doing. It is a weaving of knowledge, oral traditions, and science, reflecting a praxis that Indigenizes the academy and education. Indigenous methods work to foreground Indigenous voices, counter dominant discourses, open paths to healing, and strengthen the community. In mitigating their predecessors' past, archaeologists are responsible for creating open and safe spaces for Indigenous scholars within the academy.

Steffen, Anastasia (Valles Caldera National Preserve) and Rachel Loehman (USGS Alaska Science Center)**[224]** *Wildfires, Forests, and the Archaeological Record: Investigating Complex and Persistent Human-Landscape Legacies*

Recent wildland fires of western North America are occurring in some landscapes at intensities, severities, and extents that are far outside the historical record. These fires and their ecological and social consequences are highly-reported, and there is emerging awareness of the potential for large and severe wildfires to alter or destroy cultural legacies in fire-prone landscapes. Contemporary anthropogenic land use and management have contributed to altered wildfire regimes, but this can be better understood in the context of complex and persistent human-landscape legacies. The archaeological record is a potent source of information on how past occupations influenced ecosystem functioning, information that is needed for successful adaptation planning and climate change response in the coming decades. We discuss several projects that are ongoing in the Jemez Mountains of northern New Mexico, each designed to examine wildfire dynamics and human-landscape interactions across spatial and temporal scales. We consider the conceptual and practical tools needed to examine long-term human-ecosystem dynamics within seemingly natural areas; how fire effects can serve as secondary "artifacts" to be used to examine past fires; and how cultural and natural resources managers and researchers can work together to anticipate and offset the potential damage of wildfires.

Steffen, Anastasia [87] see Worman, F. Scott

Steffen, Martina (University of Arizona)**[46]** *Testing for Mass Processing in Archaeological Ungulate Remains*

Archaeological applications of ethnographic models require that variables derived from the activities of living people be translated into archaeological terms. Enloe suggested that processing caribou (*Rangifer tarandus*) carcasses for food storage should be recognizable in patterns of bone fragmentation. He predicted that relatively uniform and large-sized bone fragments would result from mass processing for marrow as part of logistic collector subsistence strategies, compared with smaller and less uniform bone fragments typical of individual consumption practices by foragers. He tested this expectation with caribou remains derived from known activities in historic village sites. When I applied this model to a faunal sample from the Croxton Site, the expectation that late Holocene prehistoric occupants of northern Alaska were logistic collectors that mass processed bones for marrow was not supported. This result indicates either that site occupants were not logistic collectors, that mass processing did not occur, or that mass processing is not decipherable in the bone sample. Most likely explanations are offered and some implications of this study are discussed.

Steidl, Catherine**[166]** *The Business of "Becoming": Community Formation and Greek Colonization in the Northwestern Mediterranean*

In the early first millennium BCE, Greek communities sprang up around the Mediterranean, and the West was no exception. As the story goes, Ionian Greeks arrived in southern France and a legendary marriage to the local chieftain's daughter ensured their acceptance as settlers. From their base at Massalia, they expanded their trading foothold to Emporion on the Catalanian coast, cementing a relationship that was long-attested by the presence of Greek goods on western shores. Whereas rapid 'Hellenization' was the narrative that often followed such colonization, the situation in the West was quite different. Historically-identifiable Greek settlements are sparse, and even at those known sites, the makeup of populations and nature of communities is still being called into question. This paper examines the processes of community formation in southern France and northeastern Spain—how community identities took shape, shifted, or resisted when newcomers and locals came into contact—through the lens of repeated and daily practice in cult and domestic contexts. It examines the role played by local communication and connectivity between settlements, and argues that the lack of overt 'Hellenization' in this region was in part due to a high level of shared social experience with newcomers far from home.

Stein, Julie (University of Washington)
[6] *Discussant*

Steinbach, Erik [105] see Garraty, Christopher

Steinberg, John (UMass Boston)
[265] *Political and Economic Patchworks in Viking Age Iceland*

The ninth-century Norse settlement of Iceland resulted in a system of semi-territorial petty chiefdoms, with local and island-wide regular assemblies. The volcanic island was divided up into four quarters, each with three or four local assemblies. Farmers had to pledge their allegiance to one of the chiefs within their quarter, creating a patchwork of alliances. Farms themselves may also have been cobbled together from non-contiguous blocks which allowed access to different environmental resources. Recent settlement pattern work in North Iceland suggests that this territorial patchwork resulted in a remarkably stable settlement system. Conversely, geophysical and coring surveys at the local Hegranesthing assembly site suggests that an early farmstead was removed from the assembly site itself. This combination points to stable property rights for households during the Viking Age, but a more dynamic political environment. The blurring of environmental boundaries and political frontiers with non-contiguous political and economic entities may have helped create a stable system of property rights, even in the absence of a strong central government.

Steinbrenner, Larry (Red Deer College)
[326] *Pots, People, and Pacific Nicaragua: Misconceptions about Migrant Mesoamericans and Material Culture*

The production of polychrome pottery in Pacific Nicaragua during the Sapóá and Ometepe Periods (AD 800–contact) has traditionally been attributed to various migrant cultural groups of vague Mesoamerican origin who were living in the region at the time of Spanish contact and who are usually assumed to have displaced the autochthonous inhabitants of Greater Nicoya. Supposed links between specific ceramic types and specific Mesoamerican groups that were originally based more on speculation than on actual evidence have often been treated as “facts,” to the extent that archaeological evidence questioning these links is often dismissed or otherwise ignored. This paper will examine some of the challenges associated with tying evidence of distinct potting traditions in Pacific Nicaragua to specific ethnic entities, and discuss whether or not modern archaeology is ready to provide definitive answers to all or even most of our questions about cultural identity in precontact Pacific Nicaragua.

Steingraber, Aubrey (ASM Affiliates)
[103] *Monte Cristo's Gold: A Case Study of a Hard Rock Gold Mining Town in Washington's Cascade Range at the Turn of the Twentieth Century.*

In the 1890s, the town of Monte Cristo, located deep within Washington's Cascade Range, promised to be one of the state's most profitable mining towns. Gold was first discovered in Glacier Basin in 1889, and Monte Cristo, assisted by a railroad that ran directly from the town to the city of Everett, developed nearby to support local mining endeavors. Unfortunately, the mines were not as profitable as originally hoped. By 1905, mining had mostly seized, and the town was eventually abandoned. In 2015, ASM Affiliates, Inc. conducted archaeological monitoring during a CERCLA project targeting the Monte Cristo Mining Historic District. During the project, 385 artifacts largely dating to the mining period were collected from 6 individual sites. This paper documents the results of research into the artifacts collected from the site which reveals details about the industrial and private activities undertaken within this important but short-lived Washington gold mining town at the turn of the twentieth century. It also details the international mining networks of the late 1800s which prompted the spread of new mining technologies into the American West and provided the impetus for hard-rock mining in Washington's Cascade Range.

Stelle, Lenville (Illinois State Archaeological Survey)
[175] *Chair*

Stenton, Douglas [22] see ten Bruggencate, Rachel

Stephenson, Birgitta (In the Groove Analysis Pty Ltd/University of Queensland)
[42] *Is that Roo on the Barbeque? Using Use Wear, Residue Analysis, and Biochemical Staining to Identify Varied Subsistence Practices in Aboriginal Archaeological Sites in Australia*

Environmental factors associated with open context sites are frequently considered to negatively impact on the survival of archaeological residues on lithic artifacts. This report challenges these views and documents how the simple combination of three lines of evidence enabled the identification and characterization of significant and varied subsistence practices from two sites on opposite sides of Australia. The identification of use-related residues was facilitated by using a specifically developed suite of biochemical stains to provide visual support/evidence for the stories that have been passed down through generations of Aboriginal people. The results challenge the uncritical use of artifact morphology to assume function and demonstrates the value of analytical techniques to understand wide-ranging practices across various contexts. The first study documents investigations carried out on two open context grindstones from the site of Serpent's Glen in the Western Desert of Western Australia. The second study examines flaked stone artifacts from a late Holocene open context site in the Lower Hunter Valley of New South Wales, in eastern Australia near Sydney.

Stephenson, Keith (USC Institute of Archaeology and Anthropology)
[163] *Aspects of Carved Paddle Stamped Designs from the Middle Mississippi Period*

Complicated stamped pottery vessels, and the carved wooden paddles used to stamp them, were produced in Southeastern North America beginning early in the first millennium AD and continued in some quarters well into the nineteenth century. Much of the research on paddle designs has focused on the highly decorative and diverse Woodland Period expressions, with little attention given to later, more repetitive paddle stamps. In this paper, I bring the methods of analysis used to study Woodland paddle designs to bear on thirteenth-century paddle stamps from the Sandy Hammock site in southern central Georgia. By examining design variability at the scale of the individual paddle, inferences about household level production and, ultimately, social interaction can be made.

Stephenson, Keith [365] see Smith, Karen

Sterling, Sarah L., Sarah K. Campbell (Western Washington University) and Virginia L. Butler (Portland State University)

[228] *Introduction to the Tse-whit-zen Site: Landform Evolution and Chronological Structure*

Tse-whit-zen, a large ancestral village of the Lower Elwha Klallam Tribe, located on the southern shore of the Strait of Juan de Fuca, Port Angeles, WA, was excavated in 2004 as part of a transportation project. Its location on a protected bay adjacent to open marine habitats, and inland highlands gave site occupants advantages in acquiring terrestrial and marine resources. The site is situated on a series of beaches representing relict shorelines, which generally prograde seaward over time. The site's geochronology is derived from finely defined cultural and geological deposits, with ages spanning the period from ca 2,800 years ago to contact, based on 52 radiocarbon ages from the original 2004 excavations, and 50 high-precision radiocarbon ages, taken from short-lived organic material, funded by the current project. Using excavation records, radiocarbon dates and ArcGIS we have defined seven chronostratigraphic zones and identified the remains of two structures, the occupations of which overlapped between 1250–450 BP, allowing for comparison of resource use between two households. In situ geomorphic evidence indicates impacts of two tsunami inundations; and the site was occupied coincident with known great Cascadia earthquakes. The occupation spans the Medieval Climatic Anomaly and the Little Ice Age.

Sterling, Sarah L. [228] see Hutchinson, Ian

Sternberg, Evan (Office of Contract Archeology, UNM), Justin Lowry (George Mason University) and Jason Paling (Plymouth State University)

[326] *Contemplating Trade Corridors: Cost and Pathway Analysis around Managua, Nicaragua*

Trade and intercommunity connections are keys to understanding how the ancient region around the modern city of Managua, Nicaragua, interacted and participated in the larger Central American and Mesoamerican trade corridor. This paper will present potential interpretations of long distance and local connections through a cost and pathway analysis using ArcGIS. This study will incorporate recent research on obsidian and ceramic sourcing studies from the site of Chiquilistagua into the model of interactions. Adapting site catchment areas, using trade and pathway data, and incorporating sourcing analyses will enable us to identify potential connections between sites and regions. These models may then be tested in future excavations around Managua, Nicaragua, to evaluate their utility.

Sterner, Katherine (University of Wisconsin-Milwaukee)

[264] *Examining the Use Lives of Archaic Bipointed Bifaces: Cache Blades from the Riverside Site*

During the Late Archaic to Early Woodland transition, caches of blue gray chert bifaces were deposited throughout the Midwest, often in association with burials. Their utility between manufacture and deposition has long been the subject of speculation, but never compellingly demonstrated.

Comprehensive use-wear analysis of these bifaces demonstrates that they were, in fact, used prior to deposition. Unfortunately, use-wear data in isolation tells us little about the actual role these bifaces played in the lives of the people who produced, used, and deposited them. Relatively few of these caches have been recovered as a result of systematic excavation, so other datasets that can be used to contextualize use-wear data are scarce. The Riverside Site is a Red Ochre affiliated burial and habitation site in the Upper Peninsula of Michigan, excavated by the University of Michigan, the Milwaukee Public Museum and the Oshkosh Public Museum. Excavations in the 1950s and 1960s uncovered a total of 83 bipointed bifaces. Use-wear analysis of a sample of these bifaces allows us to expand the conversation about their significance to include not only information about their depositional context but their active social and economic context as well.

[264] *Chair*

Steskal, Martin [151] see Wong, Megan

Steuber, Karin (Saskatchewan Archaeological Society), Tomasin Playford (Saskatchewan Archaeological Society) and Biron Ebell (Saskatchewan Archaeological Society)

[246] *Saving the Best 'til Last (Day in the Field): The Farr Site Community Archaeology Project*

Over 30 years ago, Biron Ebell reported the existence of a probable Cody Complex site near Ogema, Saskatchewan, situated about 100 km south of Regina. Since then, numerous artifacts have been recovered and a discrete scatter of bison faunal remains identified. Like most Paleoindian sites in the region, the Farr site had been recorded as a surface collection with artifacts and observed features exposed by cultivation, wind and water erosion. In 2014, the Saskatchewan Archaeological Society worked with Mr. Ebell to develop a community-based research program for the site. The goals of the project were to establish site boundaries, survey and map artifact and feature distributions, establish site integrity, confirm site age and interpret the site within the context of Paleoindian occupations on the northern plains. Local school groups, members of the local community and the general public assisted with pedestrian surveys, shovel testing and full-scale excavations in 2015 and 2016. This presentation will report on the results of the past two field seasons and showcase the community involvement in the project.

Steuber, Karin [122] see Riehl-Fitzsimmons, Belinda

Stevanato, Méline [174] see Elliott, Michelle

Stevens, Chris (Institute of Archaeology, University College London) and Dorian Fuller (University College London)

[27] *Agricultural Diversification, Perennials, and Complex Societies in Mesopotamia and the Yellow River*

Mesopotamia and the Yellow River of China had long trajectories from early farming through to primary urbanization, but to what extent do the archaeobotanical records indicate parallel developments in terms of agriculture? In both areas agriculture diversifies during the later Neolithic, with an increasing range of annual field crops as well as evidence for the cultivation of some perennials (tree fruits or vines). However, diversity was much

higher in western Asia, from both a highly diverse Neolithic package of staples (multiple cereals and pulses) and co-staples to a range of livestock, craft-related/cash crops (e.g., flax, carthamus), and fruits (olive, grape, fig). In China a cereal-focused Neolithic was slowly augmented by beans, fiber, drugs, and a few fruits, but evidence for regional specialization and trade in crop products is lacking. Thus, while secondary crops may indeed have been important in the agricultural rise of complex societies, a more crucial common denominator would appear to have been simple agricultural expansion to provide more land for more staple crops to support larger overall populations and larger population centers.

Stevens, Chris [177] see Fuller, Dorian Q.

Stevens, Nathan (CSU Sacramento)

[383] *Bedrock Mortars as an Indicator of Territorial Behavior in Late Holocene California*

Bedrock mortars were an integral part of intensive acorn economies in Native California and are a prominent feature of the Late Holocene archaeological record. Construction of these milling features also indicates a strong investment in particular locations on the landscape. Ethnographic evidence suggests the importance of local acorn crops led to ownership and defense of property and resource rights in many areas. Human Behavioral Ecology offers a framework for examining the conditions that may have initiated these processes and their broader effects on Native culture. When and where bedrock milling features occur may provide evidence for evolving territorial behavior during the Late Holocene and further insights into how prehistoric Californians used technology and behavioral changes to solve the difficult problem of making a back-loaded resource both palatable and profitable.

[383] *Chair*

Stewart, Andrew [35] see Friesen, Max

Stewart, Christina (University of Oklahoma)

[155] *Reading between the Lines: A Biscuitware Analysis in the Lower Chama Valley*

Archaeologists have long understood that the Lower Chama Valley in New Mexico was home to a large Tewa population during the Classic Period (AD 1340–1540) but the area underwent dramatic depopulation by AD 1600. The precise timing, motivation and movements of people are unclear due to the lack of chronological control in the region. One way to address this chronological problem in the Lower Chama Valley is through analysis of the abundant and locally produced biscuitware pottery. Bandelier Black-on-Gray (AD 1400–1550) is currently the only agreed upon sixteenth-century biscuitware, however, in 1973 Harlow proposed a later transitional biscuitware, Cuyamungue Black-on-tan (AD 1540–1560) whose validity is still debated. I will analyze the stylistic and technological variability in biscuitware pottery at the site of Sapa'owingeh (LA 306), a large late classic Tewa pueblo whose population was still growing throughout the sixteenth century, to evaluate the viability of a Cuyamungue Black-on-tan type. Identifying an additional biscuitware type will allow for a refined typological chronology and greater temporal control at sites in the region. This research is important because of its implications for clarifying a Tewa chronology and allowing for further research into population decline and migration in the Chama Valley.

Stewart, Kathlyn, Grant Keddie (Royal British Columbia Museum—Archaeology), Susan Crockford (Pacific Identifications), Gay Frederick (Vancouver Island University) and Rebecca J. Wigen (University of Victoria—Department of Anthropology)

[46] *The Maplebank Site: New Findings and Reinterpretation along the North American Northwest Coast*

Most discussions of the 'complex' fishing-gathering-hunting peoples of the Northwest Coast (NWC) focus on the Marpole Phase sites around the Fraser River Delta, BC. These contain evidence of developed social structures, an economy based on huge salmon runs and storage, and sophisticated art/architecture, and discussions of contributing factors to these traits usually focus on the perennial access to the Fraser River salmon runs. In contrast to Marpole sites are nearby 'Islands' sites, located along the Salish Sea. 'Islands' sites lack most Marpole traits, and are characterized as cultural laggards with non-specialized economies, attributed largely to lack of access to perennial salmon runs. However, new faunal data, based on 100,000 animal bones and updated stratigraphic information from Maplebank, a large, stratified Vancouver Island site, indicate that salmon comprised a greater percentage of the fauna than at Marpole and most NWC sites. This finding refutes (again) the link between salmon abundance and developed social and cultural NWC institutions. Further, an enigmatic hiatus in cultural deposition at Maplebank, coinciding with development of Marpole on the mainland, indicates widespread population displacement from Maplebank and other Islands sites. We discuss these and other findings, and their ramifications for change along the Northwest Coast.

St-Germain, Claire (Ostéothèque de Montréal, Université de Montréal), Christian Gates St-Pierre (Université de Montréal), Krista McGrath (BioArCh, University of York), Keri Rowsell (BioArCh, University of York) and Matthew Collins (BioArCh, University of York)

[385] *Black Bear among the St. Lawrence Iroquoians: Food, Tools, and Symbols*

Bear bones have been identified in the faunal assemblages of Iroquoian sites of the St. Anicet cluster near Montreal, Quebec. Three village sites will be the focus of this presentation: McDonald, Droulers, and Mailhot-Curran, with comparisons with other Iroquoian sites, especially Hurons and Iroquois. Bear bones are few in the St. Anicet faunal assemblages, but a ZooMS analysis indicates a high frequency of bear bones used in the production of bone projectile points. This unexpected result will be explained using a blend of archaeological, ethnohistorical and ethnographic data, including Iroquoian mythology and ethnonyms, providing a glimpse of the economic and symbolic importance of black bear for St. Lawrence Iroquoians.

Stickney, Teddy (American Rock Art Research Association)

[150] *Discussant*

Stiner, Mary [284] see Grimstead, Deanna

Stockhammer, Philipp [173] see Rageot, Maxime

Stockton, Trent (Tulane University)

[351] *Circumstance and Scale in After-the-Fact Applications: Maximizing Fair and Equitable Compliance for Stakeholders through Mitigation*

Recent efforts by the Corps of Engineers New Orleans District in achieving compliance with Federal laws and regulations within the Regulatory Program are reviewed. Special emphasis is given to the role(s) of stakeholders in the Section 106 process in reviewing after-the-fact applications. The role mitigation in these scenarios is also reviewed and discussed.

Stoddart, Simon (University of Cambridge)

[133] *The Longue Durée of Malta (Mediterranean) and Lismore (Argyll, Scotland) Compared and Contrasted, and Set within Concluding Remarks*
The author has undertaken fieldwork on both of these two limestone island systems, one in the Mediterranean, one leading into the Atlantic. The paper will reflect on the longue durée development of these two contrasting contexts, in terms of the rhythms of settlement organization and interaction. The first, Lismore, an area of only 23.5 km², is set within an enclosed maritime zone close to shore, off the western seaboard of Scotland. The second, Malta, a larger area of 316 km², is set within the broader enclosure of the Mediterranean, but at sufficient distance from the mainland where the technology of communication would have made a very great difference, particularly in prehistory. Occupation of both islands bridges the transition from prehistory into a globalized literate world. Both have important phases of monumentalization and strikingly different relationships to their near continents, according to the political contexts of the seas in which they are placed. The differences and similarities will be brought out in the discussion, allowing broader reflection on the papers that compare the Atlantic with the Mediterranean. The paper will conclude with a comparative analysis of the earlier examples presented, as a link to the discussants that follow.

[133] Chair

Stoetzel, Jack [285] see Walshaw, Sarah

Stolfer, Jason

[342] *Feminist Theory: The Missing Link in Archaeology*

Historically, archaeology has been viewed in an androcentric way. Minorities, including women, have been essentially invisible. Therefore, the missing link of the feminist view lends itself to telling their stories. The purpose of this poster is to describe key findings of prominent researchers addressing gender issues in the field. Key findings by Deagan (1974, 1983), recognized the importance of gender while studying the Spanish colonies. The archaeologist introduced the St. Augustine Pattern, conveying a new way of thinking in relation to analyzing mixed race populations. Additionally, Conkey (1985), heralded as a pioneer in gender archaeology and feminist anthropology, created a paradigm shift in archaeological interpretation. Furthermore, the groundbreaking research of Spector (1980), pushed the envelope of the feminist perspective through the study of the Dakota people in Little Rapids, Minnesota.

Stoll, Marijke (University of Arizona)

[137] *Ballgames and the Social Networks of the Sierra Sur: What Can Ball courts Tell Us about Political Negotiation in Southern Oaxaca?*

As a specially marked category of public architecture, ball courts were both socially-integrative and socially-divisive spaces through hosting games and other important ritual activities. Moreover, research has shown that ballgames in Oaxaca acted as mechanisms of social mediation within and between different ethnolinguistic communities. The distribution of ball courts is therefore significant and expresses underlying social and political relationships. The Nejapa region is a frontier zone between the different ethnic territories of the Zapotec, Mixe, and Chontal-speaking peoples in the Prehispanic and modern era. It is also an important stop on interregional trade routes connecting the Central Valleys to the Isthmus, and the Altiplano of Mexico to the Soconusco region. Over the course of three field seasons, 16 ball courts were recorded in the Nejapa region, the majority of which are found within a 20 km² area. Outside of Nejapa, recent research in the Quiechapa and Chontal regions to the south documented significantly fewer ball courts, while the Mixe region presents a different situation altogether. This presentation examines ball court features and distribution in Nejapa and surrounding regions in order to understand the political relationships between the different communities of the southeastern Sierra Sur through the medium of the ballgame.

Stone, Anne C. [143] see Bos, Kirsten

Stone, Jessica (University of Oregon)

[302] *Buried in the Sand: Investigations at Ucheliungs Cave, Palau, Micronesia*

Remote Oceania was one of the last major regions colonized by humans prehistorically. While there has been an increasing amount of archaeological and genetic research in the region in recent years, many parts are sorely un- or understudied. This is particularly true of Micronesia, where many questions remain as to how and when these early inhabitants settled and adapted to the area. The Palauan archipelago, which comprises hundreds of smaller uplifted limestone "Rock Islands," hosts identified mortuary sites dating back to between ca. 3000–1500 BP, with some occasionally used as camps to harvest marine resources. To expand our understanding of Rock Island cave use over the last three millennia, we present the results of new test excavations at Ucheliungs Cave, a site that had been previously identified as an early burial cave containing purported small-bodied humans. In contrast to previous research—which reported only human remains and few artifacts—our results indicate that there is an abundance of faunal material and artifacts present. New radiocarbon dates suggest long-term use of the cave for both mortuary activity and small scale marine foraging that is contemporaneous with or even slightly before the earliest accepted known human occupation of Palau.

[180] Chair

Stone, Mary Louise (Independent Scholar)

[222] *Central Andes Kotosh Religious Tradition, Third Millennium BCE: Hearth Designs as Andean Portals between Worlds*

On top of Caral Peru's amphitheater mound, an entry passageway opens to an inner sanctum—tiered benches surrounding a sunken floor and a central ceremonial hearth. This concentric design recessed into the earth repeats in diverse ways throughout third millennium BCE Kotosh Religious Tradition temples in the central Andes. Whence the concentric sunken design and hearth? I propose the hearth functioned as Andean portals for communication with unseen worlds, giving offerings, remembering ancestors. Details of archaeologists' findings in smaller mountain communities—one-room temples, offerings, and burial relics—complement Caral temple hearths amid stairs and entries, art and carvings. For long-term context, archaeologists noted varied and widespread sunken court designs through five millennia, and Spanish colonizers recorded portal sites for the unseen world. Today the design continues to be used in ancestral sunken courts, offering openings, and ritual fires of Lake Titicaca communities. This proposed model sheds light on central concerns of the earliest complex society of the Americas, a regional scale society where archaeologists noted that social cohesion was created through religion not war, a society that endured a millennium and provided the foundations of major Andean prehistoric societies. This model would correspond with the long-lived Andean worldviews of cyclic life/death/rebirth and communication with ancestors.

Stone, Pamela (Hampshire College), Ryan Harrod (University of Alaska, Anchorage) and Alyssa Willett (University of Alaska, Anchorage)

[373] *Living and Dying a Bioarchaeological Analysis of Human Remains Recovered by Earl Morris at Aztec Ruins*

Aztec Ruins, an Ancestral Pueblo site in northern New Mexico, is recognized as a large and socially complex site. Aztec Ruins is typically considered in relation to the Chaco Phenomenon, although connections to Mesa Verde have also been made. Combined these relationships suggest close ties to other temporally occupied sites. Excavations of Aztec Ruins were undertaken between 1916 and 1923 by southwestern archaeologist Earl Morris.

Among his many finds he reported excavating 186 sets of human skeletal remains with a higher concentration of burial appearing in the West Ruin area of the Aztec Ruins complex. Unfortunately, only a third of these remains were collected, and fewer have been curated. In this paper we will discuss the politics and laws that impacted what was excavated versus what was curated. In our reanalysis of some of the curated human skeletal remains, we examine markers of stress, pathological conditions, activity, and nutrition, as well as consider the potential connections between Aztec and the Chaco and Mesa Verde complexes. Combined we offer a window into the lived experiences of these Ancestral Puebloan people, and their relationships to the greater Southwest.

Stoner, Edward (Western Cultural Resource Management, Inc.) and Geoffrey Cunnar (Western Cultural Resource Management, Inc.)
[376] *Betwixt and Between the Long and Short of It: The Pequop Projectile Point Type Site in Goshute Valley, Northeastern Nevada, and Implications for the Long and Short Chronology Debate in the Great Basin*

In a 1995 study of the chronological patterning of Elko Series and Split-stemmed projectile points, Bryan Hockett concluded that neither type entirely matches the patterns of the Bonneville or Lahontan Basins; and that neither area represents good chronological analogues for northeastern Nevada. Dart points recently found in the well-dated context of an Early Archaic stratified open site in the northern Goshute Valley exhibit characteristics of both early side-notched and corner-notched types. Comparison of these points with projectile points found in Early Archaic contexts in the Bonneville Basin and other regions suggest that many of the points may have been routinely misidentified as Elko Series points and not an earlier transitional point type. In this paper, we propose a new temporally diagnostic projectile point type and explore the implications that the identification of what we term "Pequop points" may have on the Long and Short Chronology of the Great Basin.

Stoner, Wesley (University of Arkansas)

[13] *The Altica Project: Reframing the Formative Basin of Mexico*

The Altica Project, which began in 2014, is an important step in addressing the limited problem-oriented research at Formative sites in the Basin of Mexico for over two decades. Altica is the earliest-known settled village in the Teotihuacán Valley and one of the only first-farming village sites in the Basin of Mexico that has not been engulfed by the urban sprawl of Mexico City. Despite its small size and remote location, Altica was an important piece in Early and Middle Formative exchange networks as it played a role in the early trade of Otumba obsidian and imported other goods from distant places in Mesoamerica. In this presentation, we frame the research project and outline major goals. Survey and excavation results are introduced. Finally, we preface each of the presentations to situate them within the framework of the general project goals.

[13] *Chair*

Stoner, Wesley [13] see Nichols, Deborah

Storey, Rebecca (University of Houston), Gina Buckley (Pennsylvania State University) and Douglas J. Kennett (Pennsylvania State University)

[13] *A Glimpse of the People of Altica: Osteological and Isotopic/Radiocarbon Analysis*

Altica is the earliest-known settled village in the Teotihuacán Valley, and perhaps the only first-farming village site in the Basin of Mexico that has survived to modern times. Thus, it provides a rare glimpse into life during the Early-Middle Formative period. While only four burials comprising four individuals were recovered from pits dug into bedrock, each tells a unique story. Two individuals are older-aged females, the third, a middle-aged male, was accompanied by prestigious nonperishable goods. The final individual presents a mystery. This individual was a young male buried in a deviant manner, suggesting possible foul play. While all individuals have indicators of periods of poor health, stable isotopic evidence of carbon and nitrogen paint a more complete picture of the types of food these individuals consumed over their lifetime. In addition, radiogenic strontium and oxygen isotope analysis of tooth enamel help us to understand from where these individuals originated and then lived throughout late adolescence. In addition, AMS radiocarbon dating completes this story, by providing a chronology of occupation in this early farming village.

Storey, Rebecca [8] see Buckley, Gina

Storozum, Michael (Washington University in Saint Louis), Yifei Zhang (College of Urban and Environmental Sciences) and Ren Xiaolin (College of Urban and Environmental Sciences)

[33] *Dirt, Dynasties, and Devastation in North China: Geoarchaeological Perspectives from the Luoyang Basin*

Anthropogenic disturbance of alluvial systems is increasingly influential through time, but the interplay of climatic systems and basin hydrology complicate attempts to fingerprint how humans influence these systems. We evaluate the importance of climate change, fluvial dynamics, and anthropogenic environmental modification in forming the Holocene sedimentary record of the Luoyang Basin, a tributary of the Yellow River, located in western Henan Province, China. Our fieldwork indicates that an unconformity found within the basin is roughly coincident with a major, human-caused, change in the lower course of the Yellow River in AD 1128. For the first time in the late Holocene, the Yellow River took a southern course, flowing out to the Yellow Sea. This course change not only had dramatic environmental consequences for the lower Yellow River valley, but may have also changed the fluvial dynamics of upstream tributary basins, such as the Luoyang Basin, from aggradation to incision, potentially destabilizing the area for hundreds of years. Although many paleo-environmental studies imply that anthropogenic environmental change is a gradual process involving climate and environmental change. This study demonstrates that historically contingent decisions of human agents can result in sudden, long-lasting, environmental impacts.

[110] *Discussant*

Storozum, Michael [154] see Goldstein, Steven

Stowe, Michael [11] see Hyde, David M.

Strait, Madeleine [192] see Cootsona, Melanie

Strauss, Stephanie (University of Texas at Austin)

[182] *Thirty Years after La Mojarra: Epi-Olmec Writing Revisited*

Almost a century after William H. Holmes published the first study of the incomparable Tuxtla Statuette, the La Mojarra Stela was recovered from the Acula River in Veracruz, Mexico. In the three decades that followed, the hieroglyphic script that pours over these objects has been scrutinized and debated, named and renamed, both deciphered and declared undecipherable. This paper reflects on the status of Isthmian studies and explores the intricacies of Epi-Olmec visual culture as it is understood today. By drawing connections to the Late to Terminal Formative cities of the Pacific coast and highlands, as well as the other great script traditions of ancient Mesoamerica, this paper aims to move Epi-Olmec epigraphy from the realm of theoretical firebrand to its rightful place as an integral field of study within early Mesoamerican visual culture.

Strawhacker, Colleen (National Snow and Ice Data Center, University of Colorado), Grant Snitker (Arizona State University), Keith Kintigh (Arizona State University), Ann Kinzig (Arizona State University) and Katherine Spielmann (Arizona State University)

[129] *Measuring Risk to Food Security in the Prehispanic U.S. Southwest: The Salinas Region in the Broader Southwest World*

Marginal environments present risks to food shortfall to prehistoric small-scale societies, which create and rely on social and environmental strategies to mitigate those risks. One piece to understanding the vulnerability to failing to produce enough food is defining the risk factors that may limit food procurement on a given landscape—in our case, the U.S. Southwest. Using large archaeological, historical, and ecological datasets, our main risk to food production—growing season precipitation—is mapped to model the risk of maize shortfall in the U.S. Southwest. With these maps, we measure how places on the landscape may have been anticorrelated in the past, that is, one region receiving more rainfall when another region does not. By creating this ecological “risk landscape” to define the anticorrelations across a region, we can then begin to address the social strategies, such as social networks that were employed when faced with food shortfall. Due to the special nature of this session, we present analyses and methodology performed on quantifying risk landscapes across the entire U.S. Southwest, but will focus on interpretations from the Salinas region in central New Mexico, where Dr. Spielmann has devoted much of her research career.

[205] *Discussant*

Strawhacker, Colleen [335] see Wright, Aaron

Strezewski, Michael and Darrin Rubino (Hanover College)

[249] *Dendrochronological Dating of a Burned Native American Structure at Fort Ouiatenon, Indiana*

While dendrochronology has been used successfully to date standing historic period structures in the Midwest, its application in archaeological contexts has been limited. Recently, a large Native American structure was partially excavated from a village area adjacent to Fort Ouiatenon, in Tippecanoe County, Indiana. The wigwam-like structure was circular and 6.2 m in diameter. Though Native American occupation of the Fort Ouiatenon vicinity is known from ca. 1709 through 1791, very few artifacts were found in association with the structure, making it quite difficult to determine its approximate occupation date. One item, however, that was found in abundance was charcoal, as the structure had burned down. Some of the fragments were relatively large, containing as many as 43 annual growth rings. Recent efforts at developing a preliminary dendrochronological sequence for Indiana have made it possible to estimate the construction date for this structure. Through cross-dating (comparing the pattern of large and small tree rings in individual samples) a 43-year-long hickory and a 35-year-long maple chronology was developed. While additional data are still being collected in order to refine our estimates, preliminary results suggest that the structure was built in either 1776 or 1798.

Striebel MacLean, Jessica (NYC Landmark Preservation Commission)

[74] *At the Intersection: Destabilizing White Creole Masculinity at the Eighteenth-Century Little Bay Plantation, Montserrat, West Indies*

Guided by contemporary humoral theory, eighteenth-century Europeans believed climate and bodily humors to be mutually influential and correlated in their effect on human temperament, appearance, and behavior. Resettlement to a new climate was understood to create humoral imbalances fundamentally affecting an individual's character and even physical appearance including skin color. Subject to the effects of tropical climate British settlers to the West Indies thus transformed were viewed as contaminated, degenerate, and culturally distinct by the metropole, their whiteness and Britishness called into question. Born in the colonies of British descent, the white Creole was inherently degraded. Disrupting the notion that whiteness and masculinity are stable social categories, intersectionality as an analytical concept makes space for the relational aspects of white Creole masculinity situated at the intersection of the distinct social systems and power structures of the metropole, the Montserratian planter class, and the emergent racialized violence of the plantation. Looking at the way the architecture of the planter's dwelling house offset the deleterious effect of climate and his clothing asserted his white, British masculinity, this paper explores the fluid, relational, and intersectional aspects of race, gender, ethnicity, and class as they informed the complexities of white Montserratian Creole planter identity.

[74] *Chair*

Striker, Sarah (Arizona State University)

[315] *Discussant*

Stroth, Luke (University of California, San Diego)

[241] *The Effect of Raw Material on Technological Organization and Recycling Practices in a Late Woodland Rockshelter*

This paper attempts to synthesize the influence of raw material quality and abundance, mobility patterning, and social organization on the lithic assemblage. Each factor has been shown to have significant effects on the chaîne opératoire of lithic technology; acquisition of raw material, discard, and recycling. Following a literature review, distinct archaeological correlates to a wide variety of behaviors are used to analyze the lithic assemblage from Woodpecker Cave, a multicomponent rockshelter. The analysis shows that while raw material quality and abundance affected lithic production at Woodpecker Cave, the organization of technology corresponded closely to lifestyle and mobility. By understanding this locality of production as one of many along a larger landscape, no single factor, such as raw material quality and abundance, or mobility, gains primacy over the others. Using the archaeological correlates described above provides a more holistic understanding of production processes.

Stroth, Luke [342] see Truhan, Rebekah

Stroud, Katya [133] see Malone, Caroline

Stueber, Daniel (University of Victoria) and April Nowell (University of Victoria)

[121] *Lithic Technology and Reduction Strategies at Shishan Marsh 1*

The 2013–2015 excavations at Shishan Marsh 1 have revealed an impressive array of stone tools at this Middle Pleistocene Oasis. More than 7,000 stone tools including: hand axes, scrapers, modified and utilized flakes, burins, Levallois points and flakes, cores, small pebble tools and debitage associated with tool manufacture and refurbishing, have been analyzed. Analysis was conducted on all tools and debitage using the lithic attribute analysis method, and low and high power magnification to examine edges and surfaces for wear associated with use. Forty-four tools were then selected and submitted for CIEP protein residue analysis. Based on the lithic attribute analysis, microscopic tool analysis, and results of the CIEP analysis, a model of hunter-gatherer lithic reduction strategies at this Middle Pleistocene Oasis will be presented.

Stueber, Daniel [121] see Murray, John

Stumpf, Tyler (University of Kentucky), Vanessa Hanvey (University of Kentucky) and Richard Jefferies (University of Kentucky)
[87] *Searching for Spanish Footprints: Recent Geophysical Prospection on Sapelo Island, Georgia*

The Sapelo Island Mission Period Archaeological Project (SIMPAP) has been conducting research on Sapelo Island, Georgia since 2003 in search of the Mission San Joseph de Sapala. Previous test excavations have produced potential architectural features and Spanish artifacts, while previous geophysical feasibility surveys hint at the presence of unique anomalies warranting further investigation. During the summer of 2016, University of Kentucky personnel conducted new ground-penetrating radar and magnetometry surveys across the site with the goal of locating and defining architectural anomalies associated with the suspected Mission structures. The survey focused on areas north of and adjacent to previous test excavations where evidence of architectural features and Spanish artifacts were located. This poster presents the results of the GPR and magnetometer surveys and discusses the results, in combination with previous archaeological evidence, to suggest the locations of Mission period structures.

Sturm, Camilla (University of Pittsburgh)

[213] *Evaluating Structural Change in Neolithic Economies: Social Network Analysis of Utilitarian Pottery Exchange in the Jiangnan Plain*

The emergence of walled town settlements of the late Neolithic middle Yangzi River region are widely associated with the development of a complex form of social organization. While significant attention has focused on the structure and organization of individual walled settlements, little is known about the nature of social and economic interactions between communities. To address this issue, I combined geochemical analysis of pottery with formal social network methods to investigate changes in utilitarian economic networks across a 1,500-year period. These economic networks were traced between the neighborhoods of two Neolithic walled settlements, Taojiahu and Xiaocheng, over a 56 km² region during the Qujialing (c. 3300–2600 BCE) and Shijiahe (c. 2600–1900 BCE) periods. Preliminary findings indicate that networks were less centralized and better integrated in the Shijiahe than in the Qujialing period, suggesting that economic interactions between these communities became less regulated through time.

Sturm, Jennie (University of New Mexico)

[130] *Recent Advancements in Remote Sensing Studies in Chaco Canyon*

Remote sensing has been an integral part of Chacoan archaeology for several decades, helping to identify and map the broader landscape in and around the canyon. Early remote sensing studies, while pioneering, were often experimental and limited by the available technology. As the technical aspects of remote sensing continue to improve with advancements in computer power and data processing, it is now possible to move beyond experimental studies and broad characterizations of the Chacoan landscape to high-resolution, spatially accurate representations of localized areas. Furthermore, the products that can be generated from these new remote sensing investigations are often robust enough to use directly in the interpretation of a specific area's cultural history. In this presentation, results from recent remote sensing investigations (including ground-penetrating radar and aerial photography mapping) from several areas within the canyon are discussed. The analytic methods used to collect and process the data are highlighted, as well as some of the archaeological interpretations that are possible using these data.

Styles, Bonnie (Director Emeritus, Illinois State Museum), Mona Colburn (Illinois State Museum) and Sarah Neusius (Indiana University of Pennsylvania)

[61] *Exploring Comparability of Archaic Period Faunal Datasets for the Interior Eastern United States*

The Eastern Archaic Faunal Working Group uploaded nearly 60 faunal datasets for 21 archaeological sites in the interior Eastern United States into the Digital Archaeological Record (tDAR) to address hypotheses about changing human reliance on aquatic resources during the Archaic Period. As an important prerequisite for our integrative study, we examined comparability of data. To ensure comparability of datasets developed by different researchers, we addressed variable structure and mapped key faunal attributes to existing and new tDAR ontologies. We analyzed variables related to bone preservation and destruction for eight pilot sites and developed a final taphonomic protocol based on evaluation of fragmentation, burning, and bone density-mediated attrition for use on all sites. We also developed a protocol for examining comparability for site type, context type, and recovery method. Assessments of bone destruction and recovery helped us identify problematic datasets. Taphonomic biases and recovery strategies affect bone representation for all sites, but most of our datasets appear to be relatively comparable. Informed by examination of biases, we proceeded with comparisons of human use of aquatic fauna within and among sites at multiple scales and are exploring the influences of cultural preferences, population size and demography, and environmental conditions.

[205] *Discussant*

Styles, Bonnie [61] see Neusius, Sarah

Su, Yu-yin [374] see Chiu, Scarlett

Suárez Cortés, María Elena [120] see García Sánchez, Jorge

Sugimoto, Kassie [300] see Wiley, Nancy

Sugiura, Yoko [145] see Nieto, Rubén

Sugiura, Yoko (Instituto De Investigaciones Antropologicas, UNAM)

[145] *Desarrollo de Santa Cruz Atizapan: Un centro regional en la margen occidental de la Ciénaga de Chignahuapan, valle de Toluca*

En Santa Cruz Atizapan, donde nace el río Lerma en la antigua ciénaga de Chgnahuapan, Estado de México, se inician las construcciones de montículos habitacionales hace 1500 años aproximadamente, al tiempo que se estaba desarrollando el centro regional en la margen oriental de la antigua zona lacustre, denominado La Campana-Tepozoco. La distribución de dichos montículos sugiere que la antigua población de dicho sitio ya tenía una noción clara acerca de la obra hidráulica que se emprendería hacia la segunda mitad del Clásico (ca. 500/550–600 dC). Después del apogeo durante el Epiclásico (ca. 600/650–900/1000 dC), la vida lacustre al interior de la zona se abandona a causa del cambio climático y el crecimiento del nivel de agua. No obstante el sector cívico-religioso se continúa funcionando un centro regional de importancia hasta el Posclásico tardío en el siglo XVI, cuyo papel primordial es el control y distribución de los recursos lacustres, así como de los bienes provenientes de la tierra caliente al sur del actual Estado de México. En la ponencia, se presenta una síntesis general acerca de los procesos de desarrollo y decaimiento de Santa Cruz Atizapan, sitio fundamental para una comprensión cabal de la historia del valle de Toluca.

Suina, Joseph (Pueblo de Cochiti)

[34] *Getting Accustomed...*

Pueblo Indians have successfully managed social and environmental situations for thousands of years by moving our villages. However, after the Spanish invasion and the Anglo imposition, we were no longer as free to move. We've had to engage foreign ideas at our home villages in some cases very rapidly. Those in the 1950s were unlike anything we had seen in my pueblo. Seventy years' changes in America happened in ten years not giving us much time for careful thought as to what side effects these carried. Among the many were paving the road that increased contact with tourists and the cash economy. Subsistence farming, our mainstay went to the wayside. The automobile, electricity, our diet and much more changed. This new trajectory in life threatened old values that sustained us over time as a people. Life became more individualistic and stressful in order to have regular cash to support the American Dream. It pulled us from our strong cooperative orientation. Evening gatherings and storytelling gave way to television. The English language overshadowed Keres right in our homes through the radio and television. Today we struggle to revive our language and many other culture gifts of our ancestors.

Sulas, Federica [20] see Pikirayi, Innocent

Sullivan, Elaine (UC Santa Cruz)

[312] *Moderator*

Sullivan, Kelsey (University of Oregon) and Jaime Awe (Northern Arizona University)

[321] *Eccentric Caching Practices of the Belize Valley*

The ancient Maya expressed complex ideological and cosmological systems through diverse material practices. The ritual caching of objects, particularly offerings of chert and obsidian eccentrics, was a common manifestation of this integrated worldview throughout the Maya Lowlands. The study of these caches allows archaeologists to explore elements of ancient Maya ideology, which were shared across broad temporal and spatial landscapes. With over 100 years of previous archaeological research, the Belize Valley is an ideal locale for understanding regional caching practices. At the major civic-ceremonial center of Xunantunich, recent work by the Belize Valley Archaeological Reconnaissance Project revealed the presence of several dedicatory caches from the Late Classic Period, adding to the corpus of known caches in the valley. An examination of eccentric morphology and cache context from the Belize Valley elucidates the manifestation of strong regional traditions and pan-Maya ideology, as well as provides insight into access and consumption of local and long distance trade commodities.

Sullivan, Lauren (University of Massachusetts) and David M. Hyde (Western State Colorado University)

[83] *Social, Economic, and Political Changes: An Integration of Ceramic and Lithic Data from the Three Rivers Region*

Archaeological research in northwestern Belize indicates a long history of occupation beginning in the Middle Preclassic and ending with abandonment in the Terminal Classic. The collection and analysis of ceramic and lithic data on a broad regional scale and across the entire range of settlement hierarchy allow for a comprehensive examination of social and political changes that occurred across the region. Stylistic changes in the ceramics, the continuity of lithic forms, and depositional patterns of both artifact classes provide information on the activities that occurred between the Late and Terminal Classic in the Three Rivers Region.

Sullivan, Lauren [370] see Bentley, Heath

Sullivan, Lynne (University of Tennessee)

[315] *Discussant*

Sun, Lei (Henan Provincial Institute of Cultural Relics and Archaeology, China), Wenquan Fan (Henan Provincial Institute of Cultural Relics and) and Ligang Zhou (Henan Provincial Institute of Cultural Relics and)

[115] *Oral Health and Dental Attrition of Human Remains from Tianli Cemetery, Xinzhen (ca. Eighth–Fifth Century BC)*

Oral health (caries, antemortem tooth loss (AMTL), enamel hypoplasia, and dental attrition) were assessed in human remains from Tianli cemetery, Xinzhen, Central China (Zhou Dynasty, ca. eighth–fifth century BC). This study explores diet and eating habits in a population practicing dry land agriculture. Males exhibited greater frequencies of enamel hypoplasia than females. In contrast females suffered more from caries, AMTL, and tooth wear than males. Heavy wear on the upper anterior teeth is remarkable when compared to other regions and other subsistence strategies in pre-Qin China. Higher frequencies of oral health markers for females than males suggest that diet followed gender division, with more cereals such as millet in the diet of females. Stable isotope analyses from other human skeletal samples in Xinzhen suggest males might have had more access to meat than females. Furthermore, the much higher frequencies of enamel hypoplasia, cribra orbitalia, and porotic hyperostosis in males suggest that males generally were exposed to more stress than females. In addition, heavy wear on the anterior teeth at Tianli, especially in males may be related to teeth being reduced in strength by enamel hypoplasia, crops machined roughly, and/or frequent use of teeth as a third hand.

Sun, Zhouyong [115] see Chen, Liang

Sunseri, Jun (UC Berkeley)

[141] *Risk in Collaborative Archaeologies of Place as Engaged Scholarship*

Drawing on examples from my community-engaged work in post-apartheid South Africa and post-annexation New Mexico, I want to talk about the kinds of risk my community partners navigate in our collaborative archaeologies. Both communities are focused tightly on colonial-era processes that have translated into dimensions of racialized inequalities, against which we hope archaeological partnerships might be employed and produce tools that do more good than harm.

Super, Clare [50] see Snow, Meradeth

Supernant, Kisha (University of Alberta, Department of Anthropology)

[172] *What Makes Us Beat? Toward a Heart-Centered Practice in Archaeological Research*

Within the discipline of archaeology, we conventionally employ rational, science-based analyses to examine ancient cultures. Yet the lives of archaeological practitioners, contemporary descent communities, and the ancient peoples we study, are more than just minds and bodies. In this paper, we outline a framework for a heart-centered archaeological practice that draws from foundational literature on feminist, indigenous, and community-based archaeologies. We posit that a heart-centered archaeology will allow us to bring our whole and integrated selves to our practices and will broaden our understanding of and relation to the lives of the people we study. Like the organ we draw inspiration from, an archaeology of the heart flows through four main channels: 1) care; 2) emotion; 3) relationality, and 4) rigor, strengthening and feeding the structure of the discipline. Heart-centered practice, guided by these principles in the past and present, opens new avenues of research and pedagogy in which the relationships we build with ourselves, other humans, and the broader world inform our understanding of the material record and shift the ways we teach and learn about the past. Using examples from our experience, we work to discover how these principles can be applied to archaeological research and pedagogy.

[172] *Chair*

Supernant, Kisha [176] see Letham, Bryn

Surette, Clarence [319] see Boyd, Matthew

Surette, Flannery

[269] *Discussant*

Surface-Evans, Sarah (Central Michigan University)

[172] *"I Could Feel Your Heart": The Transformative and Collaborative Power of Heartfelt Thinking in Archaeology*

As anthropologists we know that the heart is considered a source of strength in many cultures. Yet in Western society and the culture of science, an epistemology of the heart or heartfelt thinking is generally feminized and as a consequence, devalued. Guided by Feminist and Indigenous theory, I have established an archaeological practice that foregrounds heartfelt thinking as part of community-based heritage work. Importantly, I strive to train the next generation of archaeology professionals to recognize the role of the heart in promoting an effective multivocal research perspective. There are many challenges to such an approach, not least of which is the perception that inclusive and reflective practice is a sign of weakness. I will discuss the personal challenges I have experienced in operationalizing an "archaeology of the heart" and explore why it is imperative to overcome these problems to reinvent our discipline.

Surma, Szymon (Institute for the Oceans and Fisheries, University of British Columbia) and Tony Pitcher (Institute for the Oceans and Fisheries, University)

[378] *Reconstructing the Historical Abundance and Importance of Large Whales in Northern British Columbia*

Whales obtained through various combinations of hunting and scavenging have long provided coastal communities worldwide with sustenance and many raw materials. However, global whale populations have been severely depleted by commercial whaling. This study combined historical abundance reconstruction with ecosystem modeling to investigate the effects of whaling on the abundances and ecological roles of five large whale species (blue, fin, sei, humpback and sperm) in northern British Columbia waters. Unexploited local whale abundances were reconstructed using population models based on recorded catches and entered into an Ecopath food web model. The changing ecological role of these whales was examined by comparing two Ecopath models representing pre-whaling and current ecosystem states. The results revealed massive changes in the absolute and relative local abundances and ecological importance of these whale species during the twentieth century. Combined with habitat modeling in Ecospace, these results indicate a vastly greater availability of both live and drift whales (particularly fin and humpback) to coastal foragers prior to the depletion of whale stocks in the early twentieth century. These results demonstrate the historical importance of whales in northern British Columbia, as well as the utility of linking population and ecosystem models in the study of whaling.

Surovell, Todd (University of Wyoming), Randy Haas (University of Wyoming) and Matthew O'Brien (California State University, Chico)

[186] *High-Precision Mapping of Human Behavior in Ethnographic Contexts, a New Tool for Ethnoarchaeology*

Ethnoarchaeological studies attempt to link human behavior to the material residues they produce for the purpose of developing archaeological method and theory. Traditional studies in spatial ethnoarchaeology, however, have focused on the mapping of material remains, but the spatial distribution of the behaviors that produced them, the thing that interests us most, has gone largely undocumented and for good reason. Until recently, it was not technically possible to map people in space in a way that is simultaneously accurate, precise, and unobtrusive. In this paper, we discuss the use of time-lapse photography and photogrammetry for the direct, frequent, and high-precision mapping of human behavior in ethnographic contexts. We illustrate the use of this method using a case study from campsites of nomadic Dukha reindeer herders in Khövsgöl Aimag, Mongolia. It is argued that this method not only provides much needed data on how humans use space but also that abundant ancillary behavioral data are collected. As such, time-lapse photography and photogrammetry could become part of the standard tool kit for ethnoarchaeological research.

Surovell, Todd [332] see Mackie, Madeline

Sutter, Benjamin [366] see Copeland, Sandi

Sutton, Mary-Jean [375] see Huntley, Jillian

Suyuc-Ley, Edgar [337] see Balcarcel, AnaBeatriz
 Suyuc-Ley, Edgar [321] see Thornton, Erin

Suzuki, Shintaro [101] see Price, T. Douglas

SV, Rajesh [167] see Gupta, Neha

Svoboda, Jiri [223] see Pryor, Alexander

Swamy, Priya [106] see Osorio Sunnucks, Laura

Swantek, Laura (Arizona State University)

[132] *Social Complexity and Wealth Inequality in Middle-Range Society: A Complex Systems and Network Science Approach to the Prehistoric Bronze Age on Cyprus*

Economic and social leaders create and maintain unequal or dominance relationships within and between communities by controlling labor, and limiting access to technological, material and ideological resources, and trade networks. Through these kinds of actions and interactions, social networks are structured and restructured altering the flow of goods, services and information. From this bottom-up process, social complexity emerges. To understand how the structure of underlying social networks leads to the emergence of social complexity in past middle-range societies, archaeological proxy data for each of the relationships defined above are analyzed using methods derived from complex systems and small world network science. Using the Prehistoric Bronze Age on Cyprus, a transitional period on a Mediterranean island with clear indications of changes in complexity from small egalitarian communities to those with social and economic leadership, the emergence of complexity will be tested at multiple scales across both space and time. These results are compared to Gini coefficients for scaling wealth inequality, and diversity measurements to understand how wealth and diversity co-vary with different kinds of social network arrangements and identify inequality thresholds for changes in social networks. The presented results will highlight a nonlinear trajectory for social complexity in middle-range society.

Swart, Peter [223] see Müller, Peter

Swenson, Edward (University of Toronto)

[179] *Quintessentializing the Power of Place in the Ancient Andes*

The co-extension of peoples, places, and things as interdependent social actors were fundamental to Andean spatial ontologies. For instance, the "multiflex" Paria Caca of the Huarochiri Manuscript was manifested as five eggs, five falcons, five brothers, and a great mountain that still bears his name. In this paper, I argue that quintessential locales in the ancient Andes were often places where wholes and parts, microcosmos and macrocosmos, interiors and exteriors, and complementary opposites either converged or became materially differentiated. Living landscapes uniting or animating essential life-forces were thus sites of heightened semiosis entailing the intensified materialization and interchangeability of different sign modalities (Peirce's modalities of firstness, secondness, and thirdness). Although reminiscent of traditional theories on the "center" as an axis or imago mundi, a comparison of unmodified wak'as and built landscapes in the Jequetepeque Valley of the North Coast of Peru will demonstrate considerable variation in how places were suffused with and radiated quintessential powers. This variation can partly explain historical differences in the political affordances of landforms and ceremonial architecture.

Swenson, Edward [272] see Warner, John

Swentzell, Porter (Institute of American Indian Art)

[34] *Tewa Place-Based History*

Tewa history is the story of places. The narrator emplaces a story within the context of Tewa time by naming the place at which the story takes occurs. By using a Tewa place-based approach to narratives of the past, I demonstrate three important points. First, that history is an ethical act. Tewa history helps reproduce the values of good humanness. Second, that Tewa place-based history reconnects the narratives of the past with people's relationship with land and linked responsibilities. As such, it serves as guidance for long and ongoing relationships with place. Finally, place-based history emplaces the past within a cultural landscape and de-universalizes history.

Swift, Jaime (University of Oxford), Rick J. Schulting (University of Oxford), Juanita Oyanedel Perez (Museo La Ligua), Violeta Abarca Labra (Museo Histórico-Arqueológico de Quillota) and Nicole Fuenzalida Bahamondes

[231] *Precolumbian Diet and Subsistence Strategies in the Aconcagua Valley of Central Chile, from the Early Ceramic to Late Periods: Evidence from Stable Carbon ($\delta^{13}C$) and Nitrogen ($\delta^{15}N$) Isotopic Analyses*

This research documents past diet and subsistence strategies of the precolumbian ceramic societies in the Aconcagua Valley of central Chile. We aim to characterize the late Holocene cultural, social and economic interactions of this geographically strategic zone between the semiarid north and more fertile central Chile. Dynamic changes over the past two millennia include the establishment of culturally heterogeneous enclaves from the north alongside local populations. The broader region of central Chile was also the southernmost limit of the Inka Empire as well as part of the southernmost frontier of maize agriculture in the Americas. We are resolving variations in diet with complimentary analyses of dental paleopathologies coupled with stable carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) isotopic analyses of bone using human skeletal remains from the collections of the Museo Histórico-Arqueológico de Quillota (MHAQ). These changes are evaluated in the context of the coeval economic and political transitions, including the adoption of new technologies and domesticates and the expansion of different cultural influences.

Swift, Jillian (UC Berkeley)

[223] *Applications of Rat Bone Collagen Stable Isotope Analysis toward Investigating Long-Term Island Socio-Ecosystem Dynamics: Case Studies from Mangareva (French Polynesia) and Pemba Island (Zanzibar)*

Stable isotope analysis of small commensal fauna provides a novel approach to paleoecological reconstruction and investigations of human site activities. The human translocation of rat species, especially the black rat (*Rattus rattus*), brown rat (*R. norvegicus*), and Pacific rat (*R. exulans*), has significantly—and often deleteriously—impacted native floral and faunal communities, particularly within island ecosystems. Rats are small-bodied omnivores with limited home ranges and highly generalized diets, and thus can provide a localized picture of landscape change and resource availability. On small islands in particular, rat diet has proven sensitive to island-wide changes in ecosystem dynamics. This paper compares bone collagen carbon and nitrogen stable isotope data from two rat species (*R. exulans* and *R. rattus*) recovered from archaeological sites within two separate island regions (Mangareva Islands, French Polynesia and Pemba Island, Zanzibar). Results demonstrate the efficacy of rat diet as a paleoenvironmental proxy for investigating human-environment dynamics, including species extinctions and nutrient flows within human-centered food webs.

Swift, Jillian [32] see Boivin, Nicole

Swinford, Steven [151] see Neeley, Michael

Syczewski, Marcin [316] see Druc, Isabelle

Sykes, Naomi (University of Nottingham), Holly Miller (University of Nottingham) and Karis Baker (University of Durham)

[285] *From Empire States to Country Estates: The Story of the Fallow Deer's Global Conquest 6000 BP to Present*

It took millennia, but the European fallow deer (*Dama dama*) a beautiful cervid species native to the eastern Mediterranean has gradually been transported around the world—its modern distribution ranging from New Zealand to the Caribbean. The translocation of fallow deer was accompanied by a remarkably consistent culture of hunting and emparkment that altered landscape and environment. Using a combination of (zoo)archaeology, isotope analysis and genetic research to reconstruct the timing and circumstances of the fallow deer's diffusion, it has become clear that the various imperial cultures of Europe (e.g., the Bronze Age Aegean, Greek, Roman, Byzantine, Anglo-Norman and British Empires) were significant drivers. However, the belief that introduced animals are invariably the result of 'invading peoples' is not always correct and our research requires much of the received wisdom concerning the history of the fallow deer and the culture-contact associated with the species' spread to be dismissed.

Sykes, Naomi [284] see Miller, Holly

Syverson, Laura (Portland State University) and Virginia L. Butler (Portland State University)

[228] *Assessing Response of Tse-whit-zen's Large-bodied Fish to Environmental Change Using Sampling to Redundancy*

Tse-whit-zen is one of the largest village excavations on the Northwest Coast; more than 1,400 features were documented and an estimated 234,563 fish bones were recovered from ¼" mesh alone. While research potential is great, the challenge of sampling such a huge assemblage is daunting. Previous research has focused on the >1/8" mesh matrix from "C" buckets, which emphasizes small-bodied fishes. To track changing representation of large-bodied fish through time and space, we devised a method of "sampling to redundancy" (STR), incrementally analyzing matrix collected in 10 L "S" buckets, screened through ¼" mesh. Analysis ceased when fish family proportional representation stabilized for a given chronostratigraphic zone within an excavation unit. To illustrate the power of STR, we review results from a study of S buckets from eight 1 x 1 m² units. Out of 441 buckets, remains from 272 buckets were analyzed, a savings of 38% in number of sample contexts studied. Fish family representation in the C (>¼") and S buckets was compared to see if additional S bucket volume altered large-bodied fish representation. To track fish response to great earthquakes, we studied representation of greenlings (mainly lingcod) and dogfish (*Squalidae*), which should be differentially affected by nearshore disturbance.

Szabo, Vicki and Brenna McLeod Frasier (St. Mary's University)

[378] *Transdisciplinary Approaches to Norse Use of Marine Mammals: History, Archaeology, and aDNA*

Historical, literary, and archaeological evidence suggests frequent use of marine mammals by the Norse across the medieval North Atlantic and Eastern Subarctic, circa 870–1500 CE. Written records indicate the importance of cetacean species in Norse economies from Norway to Newfoundland, but especially in medieval Iceland. Archaeological assemblages from Iceland reveal an abundance of worked and waste cetacean bone, most of which are morphologically undiagnostic. As such, details on the economic and subsistence value of cetaceans in Norse archaeological contexts remain unquantified and approximate. This paper presents preliminary conclusions from an ongoing NSF project that employs Sanger and Next Generation aDNA sequencing of cetacean bone from medieval Norse archaeological sites from landnám through the sixteenth century. Preliminary results offer analysis of successful applications of different aDNA methodologies, and the value of transdisciplinary approaches in analysis of species results. In addition to assessing the social, cultural, and economic importance of cetacean use among Norse populations, our genetic analyses may provide new datasets for assessing marine mammal population change in the Subarctic and North Atlantic before industrial-scale hunting impacts in the sixteenth century (Contributing authors: C. Anderung, T. Frasier, K. Grisedale, R. Harrison, K. Smiarowski, J. Woollett, F. Feeley, G. Hambrecht, T. McGovern, I. Mainland, A. Kitchener, O. Vésteinsson, V. Hreinsson, A. D. Júlíusson, B. Fitzhugh).

Szász, Hajnal [196] see Barlow, Robert

Szentmiklosi, Alexandru [76] see Heeb, Bernhard

Szigeti, Anna (Eötvös Loránd University), Virág Varga (University of Cincinnati), Viktória Kiss (Institute of Archaeology, Hungarian Academy of Sci) and Attila Gyucha (Field Museum of Natural History)

[196] *An Examination of Changing Copper and Bronze Age Trade Networks in the Körös River Valley, Southeast Hungary*

Metal is a unique raw material which societies in some parts of southeastern Europe have been exploiting since the Middle Neolithic (5500/5400–5000/4900 BCE). As previous studies in various parts of the world suggest, the acquisition and circulation of metal objects, as well as the ability to work metal have been important in the development of prehistoric societies. In our study, we compared the distribution of metal artifacts during the Hungarian Copper Age (4500/4400–2800/2700 BCE) and Bronze Age (2800/2700–900/800 BCE), focusing on Békés County. We linked these distribution patterns to trade routes in the Körös River region, analyzing the differences in the sources of copper ore utilized at different times. Based on their chemical composition, we then determined the origin of the metals used to create the bronze artifacts found in the Békés 103 cemetery.

Szpak, Paul (Trent University)**[284]** *Isotopic Perspectives on Animal Husbandry Practices*

This paper presents carbon and nitrogen isotope data from camelid (llama and alpaca) bone, hair, and wool textiles from sites throughout the north coast of Peru spanning the Early Intermediate Period through the Late Intermediate Period (200 BC–AD 1476). Through these case studies this paper explores how stable isotope data can be interpreted using various statistical methods to infer a deeper understanding of human-animal interactions in the past than would be possible using only traditional zooarchaeological data.

Szpak, Paul [284] see Guiry, Eric

Szymanski, Ryan (Washington State University)**[154]** *Human Landscape Modification and Environmental Change in the Western Kenyan Highlands*

Interpretive challenges involving issues of equifinality and causation can chronically hamper environmental reconstruction efforts, as numerous physical, environmental, or anthropogenic processes may potentially be responsible for creating observed raw data patterns. Nested multi-proxy and multi-scalar analyses offer potential means of approaching these difficult conceptual issues which can plague interpretations reliant on single lines of proxy evidence. A dataset comprised of multiple paleoecological proxies, including pollen, phytoliths, and fungal spores, derived from a sediment core from Kingwal Swamp, Kenya, is presented in order to illustrate these issues and means of resolution. Using the different origin points, production, distribution, deposition modes, and associations of these proxies, I argue that discord in data between these sources can aid in isolating some of the possible environmental scenarios which may have produced particular data patterns, and may enable researchers to more effectively separate anthropogenic versus climatic impacts on past environments. It is proposed that more intensive study of the microbotanical content of sediments is critical to improving paleoecological, and by extension, archaeological knowledge of ancient landscapes and their inhabitants.

Taber, Emily C. (Portland State University) and Virginia L. Butler (Portland State University)**[194]** *Toward Developing an Economic Model of Fish Rank for Late Nineteenth-Century Pacific Northwest Households*

Considerable research has been conducted on archaeofaunal food remains as a proxy for consumer practices in Euro-American historical archaeology. Such research often incorporates price-driven meat rankings, in which the historical cost of a meat cut determines its rank. Archaeological fish remains also present an opportunity to examine how historical communities engaged with fish that could be acquired through subsistence practices, leisure activities, or market purchases. However, the social-economic rankings of fish have rarely been considered, even in the Pacific Northwest where fish were central to human lifeways. When fish remains are incorporated into rankings, they may be included only as one ranked item ('fish') and a single cut ('whole'), which fails to recognize the cultural and economic importance of fishes in historical Pacific Northwest communities, as well as the biodiversity of fishes that can vary greatly in size, abundance, seasonality, and so forth. This pilot study is part of a research effort to establish a price-driven meat ranking for Pacific Northwest fishes between 1880 and 1910. Pricing data for local fishes has been systematically collected from late nineteenth-early twentieth century newspapers, with prices averaged and adjusted to reflect stable rankings during the late Victorian era.

Tache, Karine (CUNY Queens College)**[319]** *Early Pottery and the Quest for Fat in Northeastern North America*

Accumulating evidence point toward hunter-gatherer communities as the first inventors of ceramic containers in many parts of the world, but the incentives behind this technological innovation remain elusive. In this presentation, archaeological information and biomolecular data from organic residues analyses are combined to support a scenario in which preagricultural communities in Northeastern North America used early pottery as a fat rendering device, whether the fat came from fish oil or bone grease. Rather than a *sine qua non* for extracting nutrients from specific resources, however, the invention of pottery is best understood as part of broader developments featuring seasonal gatherings and a new articulation of social relations.

Tacon, Paul [375] see Huntley, Jillian

Tafari, Aurelien (University of South Florida), Kewin Pêche-Quilichini (University Montpellier 3) and Robert H. Tykot (University of South Florida)**[261]** *Typological and Archaeometrical (pXRF) Study of Final Bronze Age Ceramics of Cuccuruzzu, Corsica*

The construction of large stone fortresses, the *casteddi*, is a defining phenomenon of the Bronze Age period of the Mediterranean island of Corsica (France). However, the function and the precise chronological setting of these structures are still debated. The summer 2015 preventive intervention at the fortress of Cuccuruzzu has revealed some new information on the socioeconomic context of ceramic production during the Final Bronze Age (1200–850 BC). The typological study of the material indicated the existence of two distinct categories of ceramics, a fineware and a coarseware. In order to determine if these two types of ware corresponded to differential patterns of production and distribution, a portable X-ray fluorescence spectrometer (pXRF) was used to establish the chemical composition of sixty-seven artifacts and compare it with local clay sources. Multiple spots were analyzed on each sample, and multivariate statistics applied to trace elements Rb, Sr, Y, Zr and Nb. The results suggest that while most of the coarseware sherds had a similar chemical composition and were presumably manufactured with local clay, a large proportion of the fineware was made with imported or unusual raw material.

Taffere, Abebe (University of Florida)**[55]** *Terminal Pleistocene Lithic Technology and Adaptation from Bulbula River B1s4 Site, Ziway-Shala Basin, Ethiopia*

Archaeological excavation which had been conducted in 2009 and 2010 in the Ziway-Shala Basin, close to the Bulbula River Canyon at B1s4 site, has yielded lithic assemblages and few faunal remains. Two human occupation horizons (PS1 and PS2) were identified which are separated by an occupational hiatus at the very end of the terminal Pleistocene. Analysis of debitage on both unit levels indicates the presence of similar features that lead us to assume that B1s4 lithic industry was oriented toward the production of blades and bladelets. But, this site shows strong technological and industrial variabilities to early Holocene sites which are very close to B1S4. The microliths, which are widely discovered at early Holocene sites and to a lesser extent sites dated to Pre-Glacial Maximum, are hard to find at B1s4. Alike Paleoenvironmental records in the Ziway-Shala basin and other parts of Ethiopia and Eastern Africa, B1s4 has proved that terminal Pleistocene was characterized by fluctuating weathering conditions that might have forced hunter-gatherers in the region to practice diverse adaptive strategies.

Taffere, Abebe [171] see Brandt, Steven

Takahashi, Ryuzaburo (Waseda University, Tokyo)**[211] *A Consideration of Totemism in Late-Latest Jomon Age Based upon Archaeological Records***

Recent advance in anthropology have resurrected the term totemism from earlier theories developed by such scholars as Robertson Smith and E. Durkheim at the beginning of twentieth century. The crucial features of totemism are: 1) it represents total emblems of the descent groups; 2) it functions to support solidarity of the group; 3) it has as exogamic function; 4) it invokes taboos against killing certain animals and eating them; 5) it constitutes intimate relationships between human being and specific animals and plants; and 6) It strengthens the special bound human groups and their ancestors by means of ceremonial feasts and rituals. From an archaeological perspective, some elements of totemism are present in the Late to Latest Jomon age culture in Japan, including evidence of zoomorphic clay figures and ceremonial feasts and rites, animal sacrifice, polite attitude for special animals, identification animals for human. Those features were diagnostic in northern Japan in Late Jomon age.

Taivalkoski, Ariel [257] see Howard, Joshua

Takahashi, Tomonari [330] see Tsutaya, Takumi

Takamiya, Hiroto (Kagoshima University)**[180] *The Colonization of the Southern Ryukyu Islands, Japan***

The Ryukyu Islands are located in the western Pacific between the islands of Kyushu and Taiwan, stretching approximately 1,200 km. The focus of this presentation is the Southern Ryukyus islands, which consist of the Miyako and Yaeyama archipelagos. Until recently, the Miyako Island was the only island in this region which yielded fossil human remains dating to the late Pleistocene. Recently, human fossil remains dating to the same period has been unearthed from the Yaeyama islands. During this period, these islands were not connected to the mainland of Taiwan or China, indicating they crossed water gaps at this stage. This presentation first introduces these late Pleistocene data, and then examines the Holocene colonization processes. While it has been not well understood, many scholars believe the first colonization to the area took place not from the north (from the Okinawa archipelago) but somewhere from the south such as Taiwan and/or Philippines. Furthermore, there seems to have been another colonization to the islands at the beginning of the Gusuku period. This time, the colonizers appear to have come from the north.

[24] *Discussant***Takaoka, Ian (Northern Kentucky University) and Sharyn Jones (Northern Kentucky University)****[374] *Nukubulavu: An Examination of Fijian Mid-Sequence Ceramics on Vanua Levu, Fiji***

This paper reports on excavations from field seasons in 2013 and 2014 when major excavations on the main landmass of Vanua Levu, Fiji were conducted at the beach site of Nukubulavu. This site is positioned on a small peninsula in the island's southeastern Natewa Bay region. Nukubulavu produced ceramic assemblages that extend to all of Fiji's known culture history. The team also documented a deeply buried probable house floor with diagnostic artifacts that indicate intensive occupation during Fiji's Mid-Sequence (ca. 2800 BP–500 BP). The assemblage includes Late Lapita rim fragments with dentate stamping, body sherds and rims of large Fijian Plainware vessels, and fragments from the Navatu phase. With such a diverse representation of Fijian material culture and approximate dates via Radiocarbon AMS, Nukubulavu presents a rare opportunity to inspect in detail changes that may have occurred between the Plainware and Navatu phases of the Fijian Mid-Sequence. A detailed examination of the assemblage is underway, which will help to determine if stratigraphic variations, corresponding with our Radiocarbon AMS dates and Bayesian models, demonstrate clear correlations with the distribution of ceramic types.

Takigami, Mai (Yamagata University), Fuyuki Tokanai (Yamagata University) and Minoru Yoneda (University of Tokyo)**[358] *High C4 Plants Consumption from the Late Intermediate Period in the Cuzco Region***

Maize was one of the important crops for Inca political economics as a ritual and a staple food. In previous study of sacrificed children mummies found at Mt. Llullaillaco, the individuals particularly consumed C4 resources (such as maize, amaranth and domestic animals raised with C4 plants) in ritual activities. Contrary, the dietary compositions of Machu Picchu skeletons have shown diversity. The individuals from Mt. Llullaillaco and Machu Picchu were most probably immigrated from different regions and may not represent the diets in the capital city of Inca. Therefore, it is important to reveal inherent diet of the Inca group which had been emerged in Cusco region to get better understanding of their maize usages in their economy. We conducted dietary investigation on the five sites of Cuzco region using carbon and nitrogen isotope ratios. Our data revealed that high C4 resource consumption started by the Late Intermediate period. Meanwhile, nitrogen isotope ratios of Sacsayhuaman in Cuzco city were the highest. Estimation of marine resource consumption using ^{14}C date suggested that their high nitrogen isotope values were derived from C4 plants. Inca may have had an agricultural system using guano as the fertilizer or putting a priority on the amaranth cultivation.

Takigami, Mai [238] see Uzawa, Kazuhiro

Talaverano Sanchez, Arlen Mildred (Universidad Nacional Mayor de San Marcos), William McCollum (Vanderbilt University) and Steven A. Wernke (Vanderbilt University)**[75] *Uso de un espacio sagrado: Excavaciones de la sacristía de una reducción colonial en la Sierra sur del Perú***

Los espacios rituales han sido desde siempre lugares importantes dentro de las comunidades humanas pues son la expresión material de sus creencias y su fe. En el caso del Virreinato del Perú, la invasión española del siglo XVI significó un cambio radical en la concepción y materialización de la religiosidad practicada, donde la construcción de edificios de carácter religioso encarnó el cambio de vida y costumbres de los pueblos conquistados. Esta ponencia explora el espacio arquitectónico de la sacristía ubicada en la reducción de Santa Cruz de Tute, en el valle del Colca, Arequipa. Las excavaciones realizadas dentro del Proyecto Arqueológico Tuti Antiguo durante la temporada 2016 han permitido distinguir los diferentes usos de este recinto y su transición hacia un espacio sagrado y de culto. Una serie de remodelaciones arquitectónicas, la presencia de objetos de culto y contextos funerarios de infantes, señalan el uso variado de este espacio para el desarrollo de actividades rituales durante su ocupación y su posterior abandono. Estos indicadores nos dan luces sobre la vida religiosa en las reducciones durante la Colonia y nos permiten entender la relación que la población de entonces mantenía con estos espacios sagrados.

Talcott, Susan, Jelmer Eerkens (University of California, Davis) and Eric Bartelink (California State University, Chico)

[381] *Modeling the Relationship between Riverine Resource Exploitation, Technology, and Social Organization in the Sacramento River Basin*
Isotopic studies allow for a more refined look at variation in diet and mobility among individuals. These studies have been used in California as a proxy for analyzing human behavioral adaptations. In this study we use stable isotope analyses of human bone collagen and apatite to evaluate diet of

individuals from sites within the Sacramento River basin over time. Ethnographic accounts from this area emphasize the importance of mass salmon procurement and describe high levels of social organization, trade, storage, and specialized fishing and preservation technologies. However, archaeofaunal assemblages from this region often lack evidence of intense salmon exploitation, limiting knowledge of the time depth of these practices. For this study, we examine specific dietary indicators of riverine versus marine protein resource exploitation and use this to model the relationship between diet, technology, and social organization through time. Site location and chronological context are used as proxies for technological constraints and population size.

Tallarico, Vanessa [263] see Cowan, Maya

Tallavaara, Miikka [227] see Pesonen, Petro

Tang, Jigen [72] see Liu, Yu

Tankersley, Kenneth (University of Cincinnati)

[249] *Removal of Coal Contaminants from Chaco Canyon Radiocarbon Samples*

Micro-flotation, a specific gravity separation technique, was successfully used to remove coal contaminants from radiocarbon samples obtained from profiles, unit excavations, and solid sediment cores in Chaco Canyon, New Mexico. Coal from the Cretaceous Menefee Formation occurs throughout Chaco Canyon in aeolian, alluvial, colluvial, and anthropogenic sediments. The Menefee Formation contains carbonized broadleaf angiosperm and gymnosperm plants and, as such, paleobotanical analysis was not effective in the identification and removal of coal contaminants. The effectiveness of micro-flotation as a pretreatment procedure was evaluated by 1) comparing AMS radiocarbon ages on processed and unprocessed samples from the same archaeological contexts; 2) comparing a processed sample of carbonized hardwood charcoal with a sample of uncarbonized hardwood from the same archaeological context; and 3) comparing radiocarbon ages on a split sample of processed bulk carbon. The comparisons confirmed the effectiveness of micro-flotation in processing samples for radiocarbon dating in Chaco Canyon and would be applicable for similar locations elsewhere in the world.

[249] *Chair*

Tantaleán, Henry (Cotsen Institute of Archaeology, UCLA), Alexis Rodríguez Yábar (Universidad Nacional Mayor de San Marcos), Kelita Pérez Cubas (Pontificia Universidad Católica del Perú) and Charles Stanish (University of California, Los Angeles)

[308] *The Pinta Ceramic Phase: Explaining a Paracas Ceramic Phase from Cerro del Gentil*

During the last five years, we have developed an archaeological research program in the southern Peruvian coastal valley of Chincha. This project focuses on the rise of the Paracas society ca. 800–200 BCE. We excavated the monumental Paracas site of Cerro del Gentil located in the Chincha mid-valley where we recovered an important ritual context in a sunken court related to the Pinta phase. The Pinta phase was defined by Dwight Wallace in 1950's but not has been systematically described. In this paper, we describe the Pinta assemblage and contextualize it in a regional context of Paracas emergence.

Tanudirjo, Daud A. [302] see Reepmeyer, Christian

Tappan, Katie [7] see Wisner, Gavin

Tapper, Bryn [52] see Deal, Michael

Tarkanian, Michael (MIT) and Elizabeth H. Paris (University of Calgary)

[164] *An Evaluation of Stingless Bee Wax as a Pattern Material in Mesoamerican Investment Casting*

Mesoamerican metal objects have been studied in-depth in terms of alloys and production techniques, but little work has been carried out on the foundry materials used in the prehispanic casting process. In modern foundry practice, synthetic waxes, paraffins, or processed European honeybee wax (from the *Apis* genus) are commonly used as pattern materials. One possible ancient Mesoamerican pattern material is the wax of the stingless bee *Melipona beecheii*, a species known to be cultivated by the Maya. Ethnohistorical sources attest to the widespread practice of meliponiculture in prehispanic Mesoamerica at Spanish contact. Meliponiculture was particularly common in Northern Yucatán where its products, honey and beeswax, were commonly exchanged as commodities, and were staple products used to pay provincial taxes. Archaeological evidence, including metallurgical ceramics and production debris, suggests that lost-wax casting formed an important component of Postclassic period Maya metallurgical technologies at the urban centers of Mayapán and Lamanai. This paper examines the efficacy of stingless bee waxes as a foundry wax, particularly as a component of the copal-wax mixture described in the Florentine Codex. The thermal, mechanical, and rheological properties of these waxes and blends will be evaluated in order to assess their use in a foundry context.

Tarle, Lia (Simon Fraser University), George Nicholas (Simon Fraser University) and Hugo Cardoso (Simon Fraser University)

[193] *Museum Ethics and the Display of Archaeological Human Remains*

Museums display archaeological human remains to educate visitors about past people's lives, beliefs, and customs, and to encourage reflection. However, over the past fifty years, political changes, including civil rights, decolonization, and repatriation movements, have driven some museum professionals and academics to reevaluate the authority of museums and their ethics. These developments have inspired discussions about the ethical treatment of both Indigenous and non-Indigenous human remains, which are now reflected in professional guidelines and accords emphasizing 'respect.' The display of Indigenous human remains is usually considered unethical. However, when it comes to other institutionalized human remains, the definition of 'respect' is unclear. A number of museum professionals have experimented with methods of displaying non-Indigenous archaeological human remains with respect. They attempt to tackle this ethical issue and create public dialogue by displaying remains in new ways, or by removing existing displays. This presentation will review recent developments in museum ethics pertaining to the treatment of human remains, with a focus on novel approaches to displaying archaeological human remains. It will highlight public and professional reactions to such displays, and discuss what may be learned from these examples about ethical display practices for the future.

Tarquinio, Daniella (Quinnipiac University), Gerald Conlogue (Bioanthropology Research Institute, Quinnipiac Uni), Jaime Ullinger (Department of Sociology, Criminal Justice, and Ant) and Ramon Gonzalez (Radiology Assistant Program, Quinnipiac University)

[151] *Confirmation of an Osteological Feature, Diploic Veins, via Three Imaging Modalities*

Skeletons from site Tell el-Hesi (ca. 1400–1800 CE; located in the southern Levant) have been undergoing renewed paleopathological analysis with the use of nondestructive imaging techniques. Upon assessing for pathology a computed radiograph image revealed multiple thin radiolucent structures within the cranial fragments of an individual that were not observed on the surface of the bone. These canal-like structures, thought to be some type of nutrient vessel, required further analysis to substantiate the finding. Three imaging modalities; multi-detector computed tomography (MDCT), fluoroscopy and additional CR images, were utilized in order to confirm the osteological feature. Curvilinear reconstructions from the MDCT data revealed the canals traveled continuously through the diploë of the skull. A copper beading wire was passed through the canals and CR images were obtained. A micro-introducer accessory guidewire was advanced further under fluoroscopy and both methods revealed the radiopaque wire path matched the pattern noted on the MDCT image. The characteristics of these structures matched best with the skeletal alterations due to diploic veins, a normal anatomical feature. The patterns left behind by these veins can provide insight into the soft tissues of the body, information on the population, as well as phylogeny and forensic anthropology.

Tasa, Guy (WA Department of Archaeology and Historic Preservation)

[361] *Moderator*

Taylor, Amanda (Pacific Lutheran University)

[79] *Lithic Landscapes and Mobility from the Great Basin to the Salish Sea*

Beck and Jones' approach to settlement patterns is useful beyond the small highly mobile groups of the Great Basin Paleoarchaic because they expertly model how to connect lithic artifacts with the lithic landscape: first, conduct a thorough investigation of toolstone sources; second, consider how people brought toolstone to sites and how that might be reflected in the reduction sequence; and third, examine the representation of the reduction sequence at many sites across the landscape. I have been greatly influenced by this approach in my investigation of the mobility patterns of semi-sedentary late Holocene groups on the San Juan Islands, Washington. Settlement patterns here are complicated by boat travel and territoriality, but the analysis of lithic procurement, transport, and reduction still provides a useful perspective on where Coast Salish family groups moved over land and water. This research involves beach cobble surveys, analysis of transport costs, and beach cobble reduction analysis. I also consider Beck and Jones' concept of parallel shifts between climate change, settlement patterns, and lithic procurement in a Salish Sea context.

Taylor, Christopher [9] see McKee, Brian

Taylor, Geoffrey (UC Berkeley)

[19] *Identity Intersectionality and Gender in the Archaeological Past and the Archaeologists' Present*

Archaeologists live in a reality in which gender, sexuality, race, age, and occupational identities (to name a few) are pervasive and impactful in our professional and personal lives. Our individual experiences in the world are always being shaped by our place at the intersection of multiple perceived and/or performed identities in the multiple social landscapes we inhabit. It then must be accepted that social identities operated similarly for people in the past. Still, there remains a hesitance among many archaeologists to investigate the full intersection of social identities in their own work. Further, some refuse to acknowledge that some gender can be studied at all in archaeological research. At one level, this paper will review prior literature on gender and identity to propose the incorporation of previously successful methods and interpretive frameworks that may allow identity intersectionality to be incorporated into more archaeological studies. At another level, this paper will critically examine how the intellectual and social landscape among academic archaeologists has been constructed to uphold social and intellectual divisions that, in effect, enabled in the push of gender archaeology to the periphery of the field.

Taylor, William (University of New Mexico)

[114] *Equine Dentistry and Early Horse Husbandry in the Mongolian Steppe*

Although nomadic horse pastoralism remains an important way of life in eastern Central Asia, the origins of horse herding in the region and their relationship to key social developments are poorly understood. Recent work indicates that late Bronze Age people of Mongolia's Deer Stone—Khirigsuur (DSK) Complex herded horses, and used some of them for transport by circa 1200 BCE. This paper presents evidence that DSK people practiced equine dentistry and veterinary care, removing or modifying incorrectly erupted deciduous incisors that may have interfered with feeding. Results indicate a sophisticated knowledge of equine anatomy and behavior during the late Bronze Age, which would have contributed to the success of nomadic societies in Mongolia during the first millennium BCE.

[114] *Chair*

Taylor, William [114] see Fantoni, Marcello

Teeter, Wendy G. (Fowler Museum at UCLA)

[363] *Moderator*

[63] *Discussant*

Teeter, Wendy G. [189] see Hanson, Eric

Teixeira-Santos, Isabel [143] see Reinhard, Karl

Tejerina, Maria Elena [222] see Albeck, María

Tejero, José-Miguel (CNRS [French National Center for Scientific Research], SERP Barcelona University), Reuven Yeshurun (Zinman Institute of Archaeology, University of Hai), Omry Barzilai (Israel Antiquities Authority, POB 586, Jerusalem), Israel Hershkovitz (Tel-Aviv University [Israel]) and Ofer Marder (Department of Bible, Archaeology and Ancient Near)

[338] *Toward Complexity in the Osseous Raw Material Work at the Beginning of the Early Upper Paleolithic in Eurasia: The Manot Cave (Israel) Osseous Tools in the Aurignacian Emergence and Diffusion Context*

The Early Upper Paleolithic in the Levant plays an important role in understanding the emergence, dispersal, and adaptations of the first anatomically modern human populations in Eurasia. The exploitation of osseous raw materials for technical and conceptual behaviors is recognized as one of the several innovations that have occurred both in the Levant and in Europe during this time. Previous works demonstrated that the complex and innovative working of osseous materials in Europe is restricted to antler working, around 40 Ka cal BP, and are thus chronologically coincident with the emergence of the Early Aurignacian. Conversely, bone exploitation shows a continuity through the Mousterian, the Proto-Aurignacian and the Early Aurignacian, invalidating the argument that osseous material exploitation represents a radical difference between the Middle and Upper Paleolithic in Europe. We present the results of a technological analysis on the bone/antler industries from the EUP (Aurignacian) layers at Manot Cave, Israel. Comparing the technical concepts of the bone/antler working, through the operational sequence, between the European and the Levantine Aurignacian allow us to discuss the significance of the osseous raw material exploitation in the framework of the different proposed hypotheses on the emergence/diffusion of the Aurignacian techno-typological tradition over Eurasia.

Telepak, Justin [243] see Guderjan, Thomas Harold

Téllez, Miguel [142] see Fonseca Ibarra, Enah Montserrat

ten Bruggencate, Rachel (University of Waterloo), S. Brooke Milne (University of Manitoba), Mostafa Fayek (University of Manitoba), Robert Park (University of Waterloo) and Douglas Stenton (Government of Nunavut)

[22] *Establishing Provenance for Chert from Southern Baffin Island: a Multi-Scalar Approach*

Difficulties in physically or chemically distinguishing between chert from closely situated quarries have made a multi-scalar approach to chert provenance analysis necessary in some regions. We present the preliminary results of a multi-scalar chert provenance project focused on the eastern Canadian Arctic. On a regional scale, we examine ICP-MS trace element results for chert from two quarries and five archaeological sites on southern Baffin Island. Chert from the quarries and archaeological sites is chemically similar. However, provenance assignments based on these data alone must be viewed as highly provisional, given that the chemical signature of the materials analyzed may be representative of chert deposits throughout the eastern Arctic. We augment these data with ICP-MS trace element results for chert quarry and artifact samples from the Churchill region of the west coast of Hudson Bay, which diverge significantly from those of the Baffin Island quarries. These results support placing the Baffin Island quarries into a regional quarry group to which provenance for the Baffin Island archaeological material can be more confidently assigned.

Tennie, Claudio [38] see Lin, Sam

Terlep, Michael L., Travis Bugg (Logan Simpson, Inc.), Erick Laurila (Logan Simpson, Inc.) and Francis E. Smiley (Northern Arizona University)

[301] *Covering Ground: Spatial Relationships of Prehistoric Sites on Black Mesa, Arizona*

Modern applications in spatial analysis are reinventing the way archaeologists view spatial relationships in the prehistoric Southwest. Building on the extensive research conducted by the Black Mesa Archaeological Project (BMAP), this poster presentation presents new insights into spatial relationships and social dynamics on northern Black Mesa, Arizona using ArcGIS applications, such as viewshed analysis, as well as predictive modeling. Recently conducted pedestrian survey on Peabody Western Coal lease areas on Navajo and Hopi tribal lands provide spatially accurate data to address lingering questions within Black Mesa archaeology, such as the relationships between primary and secondary Ancestral Puebloan habitation complexes.

Terlep, Michael L. [140] see Bryce, William

Terry, Karisa (Central Washington University), Ian Buvit (Central Washington University/ National Parks Service) and Aleksander V. Konstantinov (Chita State Pedagogical University)

[332] *Late Pleistocene Campsites of the Transbaikai, Siberia*

Late Pleistocene settlement systems in the Transbaikai Region of Siberia were established by 21,000 cal BP, and underwent key changes as climates ameliorated into the Holocene by around 12,000 cal BP. During this time the area was characterized by construction of characteristic stone-outlined circular structures, or dwelling features, with activities situated around central, stone-outlined hearths, in riparian environments of major waterways. A few produced as many as six hearth features. With warming climates and increasing forests, inhabitants diversified and intensified their consumption of small mammals, birds and fish, aided by emerging technologies including bone harpoons and possibly ceramics. We explore the developmental variability of these unique structures along the Menza and Chikoi Rivers in the southwestern Transbaikai. Several key sites such as Studenoe and Ust'-Menza where complexes of remarkable late Pleistocene dwellings are highlighted emphasizing numerical chronology, formation processes, and associated artifact assemblages.

Terry, Richard [71] see McNeil, Cameron L.

Terwilliger, Valery (University of Kansas), Marilyn Fogel (University of California, Riverside, USA), Paul Adderley (University of Stirling, UK), Zewdu Eshetu (Addis Ababa University, Ethiopia) and A. Catherine D'Andrea (Simon Fraser University, Canada)

[171] *Learning from Scratch What the Environments Were Like as the Complexities of Societies Changed in Eastern Tigris*

Home to Aksum and other highly-developed polities, the Tigris Plateau is a leading contender for sub-Saharan Africa's richest center of ancient state formation. This and its susceptibility to environmental (climate and land cover) variation make the region compelling for evaluating whether environmental changes affected the trajectories of polities. Soils exposed by gullying are the longest continuous archives of environmental proxies in the region. Many proxies are affected by both climate and land cover. Results indicate that stable hydrogen isotopic ($\delta^2\text{H}$) analyses of specific land-plant derived n-alkanoic acid (n-alk) molecules in soil organic matter are most affected by precipitation. Furthermore, the rainfall inferences from $\delta^2\text{H}$ n-alk values can clarify whether changes in other proxies were due to climate or land cover. Our isotopic, elemental, and micromorphological analyses of gully soils suggest that Pre-Aksumite and Aksumite polities emerged during wetter intervals but that anthropogenic influences on land cover may have been very different during each period. Our present challenge is to understand possible relationships between the complexity of settlements and their

immediate environments. To meet this challenge, we are building local records of environmental change and coupling them to the emerging archaeological record of settlement characteristics in Mezber and Ona Adi.

Terwilliger, Valery [171] see Adderley, Paul

Tessone, Augusto [284] see Zangrando, Atilio

Testard, Juliette (Paris 1/UMR 8096 Archéologie des Amériques)

[369] *Mesoamerican Figurative Plaques: Elites' Legitimization Strategies during the Epiclassic Period (AD 600 to 900)*

Few authors have analyzed figurative plaques from Late Classic and Epiclassic contexts even though they are considered as prestigious artifacts and exhibited as prominent pieces in Museum collections all around the world. Several examples from Epiclassic city states of Cacaxtla-Xochitecatl (Tlaxcala) and Xochicalco (Morelos) will be analyzed. Contexts, morphologies and iconographies reveal continuities of sociopolitical and religious practices with contemporaneous Maya sites. We will propose hypotheses concerning the manufacturing, circulation and functions of these peculiar artifacts. They highlight political strategies of legitimization in which elites are represented as mediators between different beings both human and nonhuman.

Teufer, Mike

[221] *The Bronze and Iron Age Sites Saridjar and Karim Berdy, Tajikistan*

The Late Bronze Age site of Saridjar was discovered during a survey of the northern Yakhsu valley in 2010. Excavations in 2012, in 2013, 2015 and in 2016 prove that we are dealing with a 200 × 200 m large settlement with at least three construction phases. The proportion of the hand-made ceramics in all levels varies between 80% and 90%. Only occasionally wheel-made ware appears. Andronovo pottery of the Federovo phase is present in small numbers. At Karimberdy nearly all the pottery was handmade. The continuity is obvious not only in the production process but also in terms of typological development of pottery forms: small bowls with S-shaped rim are abundant at Saridzhar, and they continue in painted handmade ware in the Yaz I period of Karimberdy. Therefore Saridzhar is a transitional site between the Late Bronze Age and the Early Iron Age (Yaz I-period).

Thacker, Paul (Wake Forest University)

[389] *The Importance of Short Duration Archaeological Sites for Contextualizing Forager Organization: An Argument from the Middle and Upper Paleolithic of Central Portugal*

The majority of Late Pleistocene archaeological sites in central Portugal resulted from short-term forager activities on the scale of days or weeks. This paper explores the analytical and theoretical significance of these small, ephemeral sites for understanding Middle and Upper Paleolithic organization of technology and settlement strategies. The interpretive context provided by short term site assemblages is essential for developing robust regional hypotheses of Paleolithic behavior, including the local scale of MP raw material selection, a complex Gravettian settlement strategy for the Rio Maior region, and increasingly reliable and standardized technological organization during the Magdalenian. The variability in formation processes at different activity duration scales is an often neglected line of evidence for evaluating anthropological models of prehistoric forager adaptations, an oversight that creates a large-site bias and frequently leads to erroneous archaeological conclusions.

Thakar, Heather (Texas A&M University)

[2] *Finding our Way Forward: Collections Management in a Changing World*

Confronting the existing challenges of archaeological collections management amid increasing threat from environmental disasters Museums, Curation facilities, and Repositories worldwide are struggling to preserve irreplaceable cultural heritage. At the same time researchers and government agencies are also struggling to mitigate loss of valuable cultural heritage threatened outside of existing facilities. All involved clearly want to increase opportunities to learn valuable lessons and collect new data from material remains of the human past. This paper considers opportunities for researchers, government agencies, and museum professionals to develop new strategies to preserve the research, education, and outreach value of archaeological materials already in collections as well as new materials being excavated from threatened sites.

[291] *Discussant*

[2] *Chair*

Tharalson, Kirsten (University of Iowa) and Matthew E. Hill Jr. (University of Iowa)

[344] *Bison, Dog, and Deer, Oh My! Faunal Analysis of the Lovitt Site, Western Nebraska*

The Dismal River complex is a protohistoric archaeological complex likely representing an early Apache occupation on the Central Great Plains of North America. A key Dismal River complex site is the Lovitt site (25CH1), located in southwestern Nebraska. Excavations at Lovitt in 1939 revealed the site as a small residential locality with three ephemeral house structures and more than 150 pit features. Recent radiocarbon dating at the site suggests it was likely occupied either in the first half of AD 1500s or during the middle of AD 1600s. This study analyzes the faunal material from the site. Our study focuses on reconstructing prey choice decisions and patterns in carcass utilization. Finally, we compare our results from Lovitt to patterns of faunal use at other Dismal River sites in order to better understand early Apachean subsistence practices.

Therrien, Monika (Director)

[327] *Satisfying Needs and Negotiating Freedom in Colonial Spanish American Cities*

Unlike archaeological studies that seek to focus on the relations of power and elites, that by means of physical violence and symbolic exerted their domination over other groups assumed to be passive, an approach from practice theories and spaces of contact in which daily practices took place is proposed. It is in these spaces and through everyday activities that curiosity, knowledge and consent made it possible for the majority to survive under the colonial regime, without this implying an unconscious submission. With this purpose two spaces of practices are examined, 1) the production of ceramics, in which techniques and ways of doing converged with new decorative styles and forms, that made artisans with different historical and geographical backgrounds aware of the conditions of life imposed on them, and 2) the shops and market places, where the ceramic wares acquired various uses and meanings, both between natives and settlers. The crafts and trades exercised by artisans and merchants as they satisfied domestic and daily needs lead them also to find a place in colonial society, which, by being considered exclusionary and repressive, these groups and their practices have been made invisible in the studies of power.

Therrien, Monika [36] see Cohen, David

Theuer, Jason [273] see Freeman, Jeremy

Thibodeau, Alyson [23] see Hedquist, Saul

Thies, Meagan (Illinois State University)
[109] Moderator

Thomas, Andrea (Center for Archaeological Research, University of Texas at San Antonio)

[368] *The Evaluation of the Labor Costs of Stone Boiling Dried Maize during the Early Agricultural Period in the Southwest*

The Early Agricultural period (2100 BC–AD150–500) in the Southwest begins with the presence of maize and ends with the advent of ceramic vessel use. It is assumed maize was dried out and stored for future consumption. Once dried, maize required extensive processing to gelatinize the endosperm starch, or transform the polysaccharides back to a digestible monosaccharide, through techniques such as: parching, steeping, grinding, and/or boiling (Hard et al. 1996). Little, however, is known about the exact methods of dried maize processing during the Early Agricultural period. The addition of slaked lime to cook dried maize in boiling water, or nixtamalization, can boost digestive breakdown and the nutritional availability of the maize (Katz et al. 1974). Some Southwest archaeologists postulate nixtamalization could be achieved with an indirect firing technique termed “stone boiling” (Ellwood et al. 2013). This poster presents the results of seven stone boiling dried maize experiments. This research addressed the following questions: what are the labor costs of stone boiling dried maize and would this technique be a viable approach for daily consumption? These experiments demonstrated that the labor costs of stone boiling dried maize would be too high to be a preferred processing technique by early maize agriculturalists.

Thomas, Andrea [303] see Roney, John

Thomas, Colin

[164] *Imperial Authority and Local Agency: Investigating the Interplay of Disruptive Technology, Indirect Authority, and Changing Ritual Practice at Dos Cruces*

The Chimú smelting site of Dos Cruces is located along the Zaña River in the middle valley of the greater Lambayeque area. Dos Cruces is located at the intersection of two major trade routes and nearby several rich sources of copper ore. The smelting of ore at Dos Cruces utilized wind powered smelting technology, a new innovation for this region. Despite its obvious Chimú affiliations, Dos Cruces lacks an audiencia, or indeed any indication of Chimú administrative oversight. The denizens of Dos Cruces appear to have engaged in a campaign of site fortification unique among known Chimú crafting centers, restricting access even among the residents themselves. The ritual behavior at Dos Cruces is also distinct both from other Chimú crafting sites and other Andean smelting sites, featuring the ritual killing and burial of furnaces and the rebuilding of the entire smelting terrace at least three times over the life of the site. This paper investigates the nebulous relationship between Imperial power and local agency at Dos Cruces in the context of indirect imperial authority as well as the role of wind powered smelting in the formation of new economic and ritual understandings of copper smelting.

Thomas, David (American Museum of Nat History)

[376] *Great Basin Incised Stones and the Shoshonean World*

More than 1,500 incised stones have been documented from the Great Basin. By defining object itineraries of individual artifacts, it is possible to animate the archaeology from static to active by emphasizing motion and interaction, fragmentation and accumulation. Tracing both provenience and provenance, we can learn how these objects moved through time and space, intertwining with people and places. It is possible to craft a cartography sufficiently powerful to tease out an underlying, basic, formal structuring of ritual behavior that has epitomized Shoshonean epistemology for more than five thousand years.

[376] Chair

Thomas, Jayne-Leigh (Indiana University)

[63] Discussant

Thomas, Julian (Manchester University)

[81] Discussant

Thomas, Suzie

[150] Discussant

Thomin, Mike

[43] *Archaeologyin3 Minutes: Multimedia Storytelling in Public Archaeology*

In 2014 the Florida Public Archaeology Network began producing a webisode series titled “Archaeologyin3 Minutes.” These three-minute videos are designed to highlight archaeology in the state of Florida and feature the research of faculty and students at the University of West Florida. In 2015 one of these videos was awarded First Place Winner and People’s Choice Award for the Video Category in the Archaeological Photo and Video Festival Competition hosted by the Society of Historical Archaeology in Seattle, Washington. The overall goal of this project is to educate the public about the archaeological process and communicate the importance of preservation and protection of cultural resources through multimedia storytelling. Video has long been used a medium to present archaeology to the public. The digital revolution and availability of less expensive high-quality digital equipment, however, have empowered anyone to tell their own stories and reach much wider audiences than previously. This paper offers some lessons learned from the field for creating digital videos that present archaeology to the public, and covers a wide range of multimedia storytelling, from basic equipment needed to how to best conduct interviews with subjects.

Thompson, Amy (University of New Mexico)

[162] Settlement Development and Social Landscapes at the Classic Period Maya center Uxbenká

Using a Human Behavioral Ecology (HBE) framework, the social and environmental factors that influenced community development have been modeled at Uxbenká, a Classic period Maya center located in the southern foothills of the Maya Mountains. This study focuses on settlement decision making dynamics using a chronological assessment of the expansion of settlements based on radiocarbon dating and ceramic typologies in conjunction with statistical analyses to test which factors influenced patch selection of early colonizers of the Uxbenká landscape. We found that over time the social construction of the community shifted from an Ideal Free Distribution, where individuals had free-choice of where they settled, to an Ideal Despotic Distribution, in which despotic elites' influenced settlement choice of hinterland residents.

[162] Chair

Thompson, Ashleigh (University of Arizona) and Anna Jansson (University of Arizona)**[344] The Integrity of a Surface Collection and Its Value to a Tribe**

What is the value of a large surface collection? Surface finds are often dismissed by archaeologists as having little or no integrity. Our work uses data from 24GL304 (The Billy Big Spring Site) to speak to two different types of value for a surface collection: one being its archaeological integrity and the other the value placed on these artifacts by their descendant community. During modern times, the area around our study site has been used as rangeland, which has resulted in animal trampling causing the disturbance of the near-surface deposits. Three research questions guide our work: 1) What has been disturbed? 2) Is there any primary depositional patterning preserved among the surface artifacts? We use GIS analysis to calculate patterning among the artifacts. 3) What do the surface finds from this site mean to the Blackfeet community and tribal members who were involved in this project? Through ethnographic interview, we ask how this project interacts with the Blackfeet identity, their history, and their connection to the land. By following these research questions, we attempt to speak to value of the surface finds at our study site, as both a resource for archaeological data and as a monument to tribal identity.

Thompson, Jessica (Emory University), Alan Morris (University of Cape Town), Flora Schilt (University of Tuebingen), Andrew Zipkin (University of Illinois at Urbana-Champaign) and Kendra Sirak (Emory University)**[146] The Forgotten Significance of the Later Stone Age Sites near Hora Mountain, Mzimba District, Malawi**

In 1950, J. Desmond Clark led excavations at a Later Stone Age rockshelter at Hora Mountain, a large inselberg overlooking a modern floodplain in the Mzimba District of northern Malawi. At the Hora 1 site, he recovered two human skeletons, one male and one female, along with a rich—but superficially described and undated—cultural sequence. In 2016, our renewed excavations recovered a wealth of lithic, faunal, and other materials such as mollusk shell beads and ochre. Our reexamination of the skeletons also produced the first ancient DNA from the central African region, which together with previous morphological analysis demonstrates that the LSA foragers of the area cannot be readily fit within the known genetic and phenotypic parameters of living foragers. The significance of the Hora 1 site was made further clear by the relocation of several previously known sites also at the mountain, the discovery of four new rock art sites, and the discovery of four very rich new archaeological sites in the mountains adjacent to the floodplain. Here, we describe our renewed work and how it fits with the original findings to offer unprecedented promise for understanding the lifeways of Holocene foragers in central Africa.

Thompson, Kerry (Northern Arizona University)**[334] Materiality and Movement: Indigenous Concepts in Archaeological Analysis and Interpretation**

As investigations of cultures' material pasts, archaeology's units of analysis are tactile. The concepts we employ need material referents in order to be accessible to archaeological analysis and interpretation. To bring together the scientific method of archaeology with Indigenous frameworks, material referents of Indigenous concepts necessarily require theorizing the dynamic relationship between culture, time, and place in concert with Indigenous perspectives. In scaffolding theoretical structures that are useful to archaeologically understanding Indigenous pasts and building a more inclusive archaeology, our interpretations must account for the movement inherent in many Indigenous worldviews and attempt to work without strict adherence to traditional ideas of static moments in linear time.

Thompson, Lenore and R.C.P. Doonan (University of Sheffield)**[4] Biographies of Northwest Coast Copper: A Material Investigation**

This paper explores indigenous use of copper metal on the Northwest Coast of North America, and the impact of colonial contact on established cultural practices. Prior to contact (late seventeenth to early nineteenth century), native copper was collected, traded, and manipulated by indigenous communities that considered the material animate and powerful. Following the introduction of foreign trade materials, copper continued to be used to create culturally significant artifacts, however, strict frameworks of interaction with the metal shifted to accommodate the new materials and social relations brought by contact. This investigation adopts a biographical approach, placing indigenous artifacts and the relationships within which they are entwined at the center of the study, allowing us to address particular associations and practices with materials, objects, and assemblages. Analysis includes the combination of archaeological, ethnographic, and traditional indigenous data coupled with a detailed investigation of individual objects, including nondestructive material characterization, to identify procurement, production, and consumption strategies. In this way, it is argued that the study of copper in the Pacific Northwest aids the understanding of aspects of social, economic, and political change set in motion by the contact period.

Thompson, Victor (University of Georgia)**[163] Plummets, Ritual Dance, Individuals, and Macro-regional Interactions during the Woodland Period in Florida**

Community making during the Woodland period in Eastern North America manifested itself in a variety of material forms, most notably in the wide distribution of elaborate artifacts dispersed as part of Hopewellian related exchange. In this paper, we examine the role that one particular class of artifact, plummets, played in community making during the Woodland period in Florida. Often interpreted as fishing gear, we suggest that instead such artifacts played a large role in community style dances and can be used as indicators of regional and macro-regional exchanges among varying communities. By tracking the various styles and material types found at sites in Florida through a typological and network analysis, we argue that certain sites, such as Crystal River, played a larger role in connecting subregions in Florida, and may have served as cultural brokers across the macro-region due to their connections to Hopewell sites throughout the Eastern Woodlands. Furthermore, it appears that such connections were limited in time and given the prominence of plummets buried with certain individuals, we suggest that specific persons were entwined with some of these larger scale processes.

[110] Discussant

[81] Chair

Thompson, Victor [81] see Krus, Anthony

Thompson Jobe, Jessica [162] see Meredith, Clayton

Thoms, Alston (Texas A&M University)

[21] *Learning from Earth-Oven Baking Experiments*

Ethnohistoric and ethnographic accounts attest to the dietary importance of wild root foods (i.e., geophytes) and a diversity of earth-oven baking techniques among hunter-gatherer populations in south-central North America. Recovery of charred bulbs and tubers, as well as their microfossils, from ancient earth ovens and fire-cracked rock features illustrate that dependence on wild geophytes and earth-oven technology was widespread by the early Holocene and continued to the historic era. It is readily apparent, however, that observations and studies of living hunter-gatherer populations attest to far more variability in oven morphologies, baking times, and food types than has been identified archaeologically. To better understand relationships between historical accounts and archaeological observations, we have conducted a series of actualistic experiments, including baking geophytes for 20–40 hours in large ovens, with and without rock heating elements, and baking meats and geophytes in a variety of small earth ovens for 2–3 hours. Another important aspect of this kind of research is its potential contribution toward bridging persistent gaps between scientific and humanistic approaches to archaeology by calling attention to ancient foodway revolutions and related changes in behavioral systems that accompanied worldwide transitions from paleo to modern diets.

Thornton, Erin [5] see Emery, Kitty

Thornton, Christopher (National Geographic Society)

[70] *Funding "The Human Story" at National Geographic*

For over a century, the National Geographic Society has provided field research grants to archaeologists and anthropologists from around the world, and then told their story through our media. Over the past few years, National Geographic has gone through a tumultuous period of financial instability and schizophrenia between the nonprofit and for-profit arms. The new joint venture created with 21st Century Fox in the fall of 2015 created a fully nonprofit National Geographic Society with a sizable endowment and a 30% share in the for-profit NG Partners (e.g., Channel, Magazine, Travel, Books, etc.). With great wealth comes great responsibility, and National Geographic is looking to make a broader impact in "The Human Story"—i.e., research, preservation, education, and storytelling in anthropology, archaeology, and paleoanthropology—beginning in 2017. A summary of the recent changes at NGS will be presented as well as a first look at our plans for the future.

[29] *Discussant*

Thornton, Erin (Washington State University), Richard Hansen (FARES Foundation, Mirador Basin Project) and Edgar Suyuc-Ley (FARES Foundation, Mirador Basin Project)

[321] *Ancient Maya Animal Use at El Mirador: Subsistence, Ceremony, Exchange, and Environmental Resiliency*

El Mirador (Petén, Guatemala) is among the largest Preclassic settlements in the Maya lowlands. The site has attracted attention due to its size and antiquity, but also for its location within a region containing few permanent or perennial water sources. This study presents a preliminary analysis of the site's faunal remains to assess diet, ritual, habitat use and exchange. Comparison of the El Mirador data with other Preclassic faunal assemblages allows us to assess the degree to which animal use patterns were shaped by local environmental conditions or larger pan-Maya Preclassic dietary and ritual traditions. Although a large portion of the faunal remains date to the Late Preclassic (350 BC–AD 150), remains associated with a Late Classic (AD 600–900) resettlement provides an additional opportunity to address diachronic variation in animal use, and how the local environment may have changed or recovered after nearly 500 years of human abandonment. The dataset is thus significant to documenting the timing/tempo of potential wildlife resiliency in the Maya Lowlands.

Thornton, Taylor (University of Toronto), Jason King (Center for American Archeology), Jason Herrmann (Eberhard Karls Universität Tübingen) and Jane E. Buikstra (Arizona State University)

[241] *Marking and Maintaining Empty Spaces: A View from the Golden Eagle Site*

The Golden Eagle (11C120) site enjoys unique status among prehistoric sites of the Lower Illinois River Valley due to its large earthen enclosure. This elliptical ditch and embankment circumscribes a number of mounds assumed to be of Middle Woodland origin (ca. 50 cal BC–cal AD 400), however, other diagnostic Middle Woodland attributes are absent. Magnetic survey and three seasons of excavations with field crews from the Center for American Archeology in Kampsville, IL, have thus far revealed no significant concentrations of artifacts or other cultural residue within the enclosure. Compared to other Middle Woodland mound sites in the Lower Illinois River Valley, this pattern appears anomalous, though not unprecedented. The Kamp (11C12) and Mound House (11GE7) sites, for example, each include relatively debris-free spaces enclosed by earthen structures. Incorporating evidence both from within and beyond Illinois and the Middle Woodland period, we discuss possible motives for the creation and maintenance of spaces free of material culture.

Thorud, Connor [46] see Dodrill, Taylor

Throgmorton, Kellam J. (Binghamton University)

[266] *Measuring Mobility: Comparing Indices Developed from Architectural and Paleoethnobotanical Datasets*

Thirty years of research on mobility and sedentism shows that population movement occurred for reasons both ecological and social. Population movement could occur over short or long distances, could occur seasonally or generationally, and could involve both small and large groups. While archaeologists have theorized mobility in a variety of ways, they have not developed a robust body of methods for measuring and comparing mobility between households at the intrasite or intersite level. This paper uses architectural and archaeobotanical datasets to create indices of residential mobility. We apply these indices to sites within the Western Puerco Region of east-central Arizona and west-central New Mexico dating between Basketmaker II and Pueblo III (500 BC–AD 1300) to explore long-term trends in mobility. In addition, we discuss the degree of congruence and discrepancy between the indices developed using architectural and paleoethnobotanical data. The research has relevance for research on architecture and residential movement more broadly.

[266] *Chair*

Throgmorton, Kellam J. [301] see Schachner, Gregson

Thulman, David (George Washington University) and Maile Neel (University of Maryland)

[100] Local Scale Cultural Transmission: How Are Neutral Artifact Traits Manifested at Neighborhood Boundaries?

Archaeologists are paying increasing attention to prehistoric social organization using learning theory, social networks, and the distributions of artifact variation. A starting assumption is that artifact variation will present an isolation-by-distance distribution, a concept developed by Sewall Wright to explain population genetic distributions. Here we extend Wright's work and adopt his neighborhood model as an analog to explore the small scale interactions between two groups making different variations of the same artifact. We examine the boundary conditions and explore three hypotheses of human behavior that would result from interactions of two groups: blending the shape of both artifact variants, blending of the minority shape, and exaggeration of shape differences to assert ethnic identity. We test these hypotheses against the null hypothesis of no effect with new statistical methods using the shapes of set of Early Archaic projectile points from Florida, defined using landmark-based geometric morphometrics (LGM). The results show no difference in the distribution of artifact shapes that support any of the hypotheses. We conclude the pattern of shape variation was due to long-term residence of males from outside the neighborhood.

Thurber, Hali (American University) and Justin Uehlein (American University)**[336] *You Sleep Alone, Away from People: Understanding the Movement of Hobos and Other Transient Laborers (ca. 1880–1940)***

Throughout the late nineteenth and early twentieth centuries, hobos and other transient workers crisscrossed the nation, taking temporary jobs wherever capital demanded labor that exceeded local resources. Despite their contingent status as surplus laborers, hobos were cast as morally bankrupt deviants, insane, and sexually ambiguous men by media outlets across the nation. State laws and county and town ordinances were summarily passed barring hobos from entering towns, cities, and otherwise populous areas. As a result, hobos were effectively pushed into the margins. Yet, their labor was still a requisite factor in the continued functioning and expansion of U.S. economic networks. In this paper, we utilize ArcGIS platform to build on the results of excavations conducted in the summer of 2016 at a Great Depression Era hobo camp in South Central Pennsylvania—the Delta Trestle Hobo Jungle. In particular, we use GIS to explore the formation of a transient community in proximity to an expanding railroad network that not only linked industrial centers and natural resources across the Mid-Atlantic, but facilitated the mobility of laboring individuals to sources of employment and sustenance at the turn of the twentieth century.

Thurston, T. L. (SUNY Buffalo)**[324] *Reversals of Fortune: Understanding Shifts in Political Power from Above and Below***

Current social theories from a variety of disciplines offer ways through which we may understand when and why citizens of a polity or subjects a ruler are likely to protest or rise in response to problems in the relationship between governments and those they govern. Some forms of asymmetry and inequality serve as good general predictors of when protest, rebellion, or civil war are most likely to occur, while the ways in which these issues are framed and resolved vary from society to society. In case studies from early historic Europe, both general predictors and unique contexts can be examined using collective action theory, cultural dimensions theory, and the theoretical concepts of political peoplehood and reiterated problem solving as keys to understanding the power of those 'above' and 'below' and the outcomes of different kinds of conflicts.

[324] *Chair*

Tiesler, Vera [140] see Chatters, James

Tifental, Emilia (University of Montana) and Kathryn Bobolinski (University of Montana)**[50] *Housepit 54: Dogs and Their Changing Roles***

Excavations at the Bridge River site, British Columbia have been ongoing since 2003. The careful study of these housepits have significantly increased our understanding of the communities that inhabited the Middle Fraser Canyon over 1,000 years ago. The completion of the Housepit 54 excavation has provided further evidence of the many facets of indigenous life at Bridge River; among these is the role of dogs. The possession and many uses of dogs in the Middle Fraser Canyon is well documented through excavations, traditional knowledge, and ethnographic accounts. Domesticated dog remains in Bridge River households have been interpreted as markers of inter-household wealth and status. The current study is aimed at better understanding the role dogs played in the many occupations of Housepit 54. A close analysis of all skeletal remains of canines recovered from Housepit 54 is undertaken with a focus on taphonomic processes; coprolites, dog aDNA, and stable isotope data will also be assessed. We then consider potential interpretations of human behavior regarding dogs.

Tilden, Doug [204] see Slocum, Diane

Tilley, Lorna (Australian National University)**[31] *Extending Osteobiography: Disability, Care, Agency, and Emotion***

Based on evidence in human remains suggesting survival despite functionally-limiting disability, the bioarchaeology of care approach infers provision of health-related care; identifies likely elements of this care; then explores the implications of care practices and outcomes for increased understanding of both the subject of care and their community. A comprehensive osteobiography of the care-recipient (framed within the individual's life course and lifeways, and acknowledging the centrality of individual agency in managing disability) is used reflexively throughout this process to interrogate aspects of the subject's experience. So far, however, this analysis has neglected the role of emotion in shaping behaviors associated with disability and care. Most archaeological discussion of emotion to date has been curiously impersonal, concentrating either on generalized reactions to significant events (ritual sacrifice, violence) or on the 'emotional identity' invested in specific artifacts. In contrast, the impacts of serious disease—frightening, restrictive, demanding, unpredictable—evoke intensely personal emotional responses in sufferers and caregivers alike, and an archaeological focus on emotion in this context may be particularly rewarding. Using case study illustrations, this presentation looks at what happens to osteobiography when the bioarchaeology of care meets the archaeology of emotion.

Tinker, Martin (U.S. Geological Survey)**[313] *Discussant***

Tivoli, Angélica [284] see Zangrando, Atilio

Tjong, Amy [138] see Solovyeva, Vera

Tobe, Shanan S. (Arcadia University), Courtney Mower (Arcadia University), Anna Dhody (Mütter Museum), Carolyn Rando (UCL Institute of Archaeology) and Kimberlee S. Moran (Arcadia University)

[14] *Forensic Techniques to Investigate Museum and Archaeological Samples*

Forensic biologists utilize the latest DNA technologies to deal with low level, difficult, and degraded samples on a regular basis. In fact, forensic testing is specifically designed and validated to be robust under conditions that would cause most other genetic testing to fail. It is therefore no surprise that forensic genetic techniques can assist museums with research questions regarding their collections. Here we discuss how, using forensic techniques and testing, we were able to analyze museum exhibits/samples to determine either species, in the case of nonhuman samples, or, in the case of human samples, genetic profiles including ancestry markers, using Next Generation Sequencing.

Tobe, Shanan S. [14] see Mower, Courtney

Todd, Lawrence (GRSLE), Rachel Reckin (Cambridge), Emily Brush (University of Wyoming), Robert Kelly (University of Wyoming) and William Dooley (GRSLE)

[345] *An Alpine Archaeological Landscape in the Greater Yellowstone Ecosystem, Wyoming*

The alpine archaeological record above 3000m of Greater Yellowstone Ecosystem has received much less research attention than the adjacent plains, basins, and foothills. We have been working in an area of NW Wyoming where dense surface stone tool scatters, stone features (including some of the highest elevation habitation stone circles in the region) are associated with dwindling ice patches that have yielded both perishable artifactual material and an array of wood and bone that provides information on past environments. Since 2014, a 175 ha area at elevations from roughly 3,200–3,500 m has been inventoried from the artifact-based documentation perspective. Locational and basic descriptive data on nearly 20,000 items have been recorded and provide a glimpse of the complexity and diversity of this high elevation landscape. While there is indeed evidence of big game hunting, there are also indications that the area was used by residential groups in addition to task-specific hunting parties. Data from this inventory are examined in the context of regional landscape distributional patterns.

Todd, Lawrence [88] see Brush, Emily

Todisco, Dominique [226] see Borrero, Luis

Toffalori, Elena [37] see Perlingieri, Cinzia

Tokanai, Fuyuki [358] see Takigami, Mai

Tokovinine, Alexandre (University of Alabama)

[39] *Copan Reloaded: A New Look at the Ante Step and Its Context*

This presentation reassesses the chronology and meaning of the inscription on the hieroglyphic step of the Ante structure at Copan, Honduras. The analysis was made possible by a high-resolution 3D scan of the step produced in 2011. The new interpretation indicates that the city of Copan underwent a re-foundation event upon the accession of its eighth ruler, Wi' Ohl K'inich. The known contexts of similar statements are discussed along with the implications of several possible translations for our understanding of the sixth-century history of Copan during the crucial transition between the Early and the Late Classic. The textual information is compared to other data from the same period.

[39] *Chair*

Tolaba, Jose Luis [222] see Albeck, María

Tomaskova, Silvia (UNC Chapel Hill)

[65] *Discussant*

Tomasto-Cagigao, Elsa (Pontifical Catholic University of Peru) and Luis Jaime Castillo (Pontifical Catholic University of Peru)

[308] *Artisan Production and Morphological Changes in Skeletons from San Jose de Moro (North Coast of Peru)*

The study of occupational stress markers was an attractive investigation field some years ago, due to the alleged possibility for the identification of ancient activities through skeletal changes. Nevertheless, a critical vision of the issue evidences that this relation is not so easy to establish, because bone biology is complex and also because different activities may produce similar changes. This does not mean that this type of studies should be abandoned. On the contrary, it is a call for more rigorous methodologies and for the building of a corpus of information about changes occurred on skeletons from individuals with known activities in life. In this presentation we show the results of the analysis of four skeletons from different epochs that were excavated in the prehispanic cemetery of San Jose de Moro (North Coast of Peru). These skeletons were associated to elements related to metal and textile production. We searched the processes performed by modern artisans in the region to produce metal and textiles, and we explore if there is a congruency or not between the observed changes in the skeletons and the activities suggested by the funerary goods.

Tomczyk, Weronika (University of Warsaw)

[316] *Local Food, Exotic Sacrifices: The Tentative Summary of the Animal Management in Castillo de Huarmey.*

Even through the majority of faunal remains so far recovered at Castillo de Huarmey site derived from ceremonial contexts (i.e., main mortuary mausoleum and adjacent palatial complex), studies demonstrate that at the very least, the site's elite inhabitants extensively exploited local resources, and simultaneously benefited from developed trade connections. At the core of animal management was the extensive camelid husbandry. The standard zooarchaeological analysis and mortality profiles indicated that camelids served as a source of meat, pelts, and material for bone tools. Stable isotopic analysis, together with research on bone pathologies confirm the local origin of most animals, but not of all. Distinctive isotopic ratios and vertebrae pathologies suggest usage of few camelids as beasts of burden. Scarce marine birds and sea lion (*Otaria flavescens*) findings suggest limited utilization of marine resources as well. Additionally, the presence of exotic and non-consumable species such as: monkey (f. *Atelinae*), condor (*Vultur gryphus*) and parrot (*Amazona aestiva*) in the sacrificed assemblage possibly reflects long-distance trade and is a sign of Castillo's importance as a local Wari capital.

Toney, Joshua (Garcia & Associates) and Michael Desilets (Garcia & Associates)**[302]** *Searching for the Lost Marines of Guadalcanal*

In early 2016, Garcia & Associates conducted forensic archaeological investigations for the Defense POW/MIA Accounting Agency (DPAA) on Guadalcanal, Solomon Islands. DPAA (formerly JPAC) is the Department of Defense agency tasked with providing the fullest possible accounting for missing American service personnel from past wars. During World War II, the Battle for Guadalcanal lasted from 7 August 1942 to 9 February 1943 and included intense ground fighting to secure the airstrip known as Henderson Field. Not including sea battles, more than 1,200 Marines and 26,000 Japanese soldiers were killed during the six-month battle in the Solomon Islands. As part of its continued effort to recover and identify missing U.S. war dead, DPAA has increased its effort to foster public-private-partnerships (P3) to maximize the number of missing personnel accounted for through search and recovery operations. GANDA was fortunate enough to participate in one of the first P3 operations. The GANDA team, working closely with DPAA personnel and local informants, conducted investigative and data recovery excavations at a suspected war-time burial site possibly associated with one of the more than 500 Marines that remain missing in action in the Solomon Islands today.

Tong, Tao [115] see Zhang, Xu

Toniello, Ginevra (Simon Fraser University, Hakai Institute), Dana Lepofsky (Simon Fraser University, Department of Archaeology) and Kirsten Rowell (University of Washington, Department of Biology)**[380]** *Ancient Clam Gardens and Ecological Enhancement on Northern Quadra Island, British Columbia*

Clam gardens, anthropogenic rock-walled terraces built at the lowest intertidal, are part of an ancient system of mariculture of the Indigenous people of the Northwest Coast of North America. The construction of clam gardens increased shellfish production by increasing ideal clam habitat and creating substrate preferred for clam growth. On Northern Quadra Island, where there is a dense concentration of clam gardens, we assess bivalve productivity of clam gardens by 1) calculating how much clam habitat is created by constructing clam garden terraces; and 2) comparing the growth rate of clam shells from clam gardens with those from non-cultural contexts. In Kanish Bay, over 80 clam garden features result in an increase of 20,000 to 34,000 m² of clam habitat. Butter clam (*Saxidomus gigantea*) specimens spanning 11,500 years allow us to analyze patterns of clam growth throughout Holocene. By expanding our ecological understanding of clam gardens, this analysis enhances our understanding of the extensive ecological knowledge of marine environments held by coastal First Nations.

Toniello, Ginevra [47] see Neudorf, Christina

Tonoike, Yukiko (Yale University) and Dawn Brown (Yale University)**[193]** *Beyond Impressions: Systematizing Sherd Identification Using the Yale Khabur Basin Project Collection*

The first step in ceramic analysis is typically to determine the age or cultural affiliation of the sherds. Traditionally, this process is done through comparisons of superficial attributes to those of sherds that are already known. This task is difficult to do without years of region-specific experience and knowledge. Using the ceramics collected from over 300 sites, ranging over 5,000 years through surface collecting survey in northeastern Syria by the Yale University Khabur Basin Project (KBP), we plan to systematize this identification process using a method akin to that used in biological keys. We aim to determine the age of an unknown sherd through a system of observations, rather than just impressionistically. Such a systematic approach should improve consistency among analysts, particularly those without firsthand knowledge of ceramics from the various periods of this region. This poster shows the first attempt at developing such a system, using the example of bowls from the KBP. Beyond the superficial inspection of sherds, we plan to carry out additional modern technical analyses to augment the macroscopic observations with other aspects such as paste, temper, clay, and firing.

Toohy, Jason (University of Wyoming)**[147]** *Discussant***Toro, Fabian (University of Pennsylvania), Chantel White (University of Pennsylvania) and Joyce White (University of Pennsylvania)****[177]** *Developing a Legacy Collection of Traditional Rice Cultivation: Implications for Archaeobotanical Study*

Legacy ethnobotanical collections have untapped potential to elucidate human-plant relationships through time and space. This paper examines a subset of a comprehensive ethnobotanical collection undertaken in 1979–1981 in northeast Thailand. The subset comprises 43 traditional rice cultivars and wild forms, each collected along with detailed information about cultivar-specific uses and growing conditions. Our study includes morphometric examination of grains and spikelet bases with the objective of documenting variability within both individual spikes and across the species continuum. Ultimately this examination provides a platform for thinking about domestication processes in the past and interrelationships between wild and cultivated forms, particularly when considering harvesting times and field conditions. These data and this legacy collection can be used as a comparative for archaeobotanical assemblages as well as future genetic studies.

Toro, Fabian [261] see Dawson, Emily

Torpy, James (University of Michigan), Paul Nick Kardulias (College of Wooster) and Drosos N. Kardulias (Wooster High School)**[90]** *The Eye in the Sky: Use of an Aerial Drone to Record Landscape Alteration in the Malloura Valley, Cyprus*

The use of unmanned aerial vehicles or drones on archaeological projects has proliferated over the past few years. As with many new technologies, the use of drones has gone through several phases. Initially, there is the fascination with a new instrument, followed by more sober assessment of how the equipment can be used to address questions of scholarly interest. In an effort to record the changes in the local landscape of our study area in central Cyprus, the Athienou Archaeological Project used a drone to take aerial still shots and video. One issue that drone users increasingly face is the development of new regulations. Because of our location in the UN buffer zone, we obtained permission from national and local government offices and the Cypriot National Guard. In seven flight episodes we took aeriels of an Archaic-Roman Sanctuary, buildings from the adjoining Roman-Medieval settlement, two groups of tombs to the north, remnants of an early twentieth century house, a stone basin production site, and an Aceramic Neolithic quarry. Comparison of these images with aerial photos from the 1960s allows us to monitor the evolution of the Malloura Valley and the impact on archaeological sites of agricultural transformation of the landscape.

Torpy, James [89] see Trudeau, Nicholas

Torquato, Melissa [191] see Hawkins, Hannah

Torreggiani, Irene [326] see Gill, Lucy

Torres, Mauricio, Andrea Chávez, Andrea Méndez and Byron Ortiz

[62] *Proyecto Arqueológico Cochasqui-Mojanda*

El Parque Arqueológico Cochasquí se encuentra en las estribaciones sur orientales del macizo montañoso de Mojanda, en la provincia de Pichincha a 52 Km al norte de Quito. El sitio está conformado por 15 pirámides truncas, casi todas conservando sus rampas que facilitan el acceso a la parte superior. En el mismo espacio se puede encontrar varios montículos circulares. En 1932 Max Uhle—el primer arqueólogo en realizar excavaciones dentro del sitio—concluyó que las pirámides fueron sitios ceremoniales y rituales. 30 años más tarde, una misión arqueológica alemana bajo la dirección de Udo Öberem, establecieron dos fases de ocupación del sitio: Cochasquí I, de 950 DC hasta 1250 DC; y, Cochasquí II, de 1250 hasta el 1550. El proyecto arqueológico Cochasquí—Mojanda ha iniciado con la búsqueda de nuevos datos que permitan ampliar la comprensión global de la estructura del sitio así como su posición regional. Para ello se ha recurrido a la aplicación de recursos tecnológicos no intrusivos como el uso de ground-penetrating radar (GPR), así como modelamiento 3D a partir de fotografía aérea con drones, e información LIDAR.

Torres, Paola [218] see Andrieu, Chloé

Torres Ochoa, Cesar [329] see Magnoni, Aline

Torres-Rouff, Christina [134] see Pestle, William

Torres-Vélez, Lyrsa María (Boston University)

[289] *Cookbooks as Documentary Sources: The Material Culture of Kitchens and Tables from Nineteenth-Century Puerto Rican Households*

Puerto Rico's culinary history is characterized by a blend of the different ethnicities that settled in the island after the Spanish Conquest, as well as the incorporation of precolumbian food ways. This ethnogenesis can be studied through the culinary traditions that conform what we now refer to as criollo. This presentation uses *El Cocinero Puerto-Riqueño*, the only cookbook available from the nineteenth century in Puerto Rico, as a primary source to address the material culture associated to activities related to kitchens and food consumption. First, by applying research methodologies previously proposed and used by Elizabeth Scott and Mary Beaudry, we will demonstrate the research potential of cookbooks to establish the utensils used for both food preparation and serving. Then this data will be used to outline the type of objects that could have been found in certain nineteenth-century Puerto Rican households. Lastly, we will like to address the social context in order to pose questions regarding who might have had access to the book, as well as how culinary traditions might have been passed from one generation to the next.

Torvinen, Andrea (Arizona State University)

[352] *Establishing the Nature and Scale of Ritual Behavior at La Quemada, Zacatecas, Mexico*

The northern frontier region of Mesoamerica is partially defined by its ceramic traditions (i.e., red-on-buff, incised-engraved, and resist); however, observed variation in the types belonging to decorated wares suggests these types are likely local materializations of a regional ideology. Testing this hypothesis requires first determining the provenance of decorated ceramics recovered from a northern frontier site and then exploring the intrasite distribution of local and nonlocal ceramics through the lens of different social mechanisms. The case study for this project is La Quemada in Zacatecas, Mexico, which was the focus of the Malpaso Valley polity during the Epiclassic period (AD 500–900). La Quemada lacks evidence supporting the existence of an elite class or marketplace, but does possess traits associated with pilgrimage centers. Therefore, this paper uses an ethnographic model of prehispanic ritual practice based on northern frontier descendant communities (i.e., the Huichol and Cora) to evaluate if ritual ideology was the mechanism responsible for regional ceramic traditions. The conclusions of this research will establish the nature and scale of ritual behavior that may have occurred in northern frontier centers (e.g., La Quemada, Alta Vista, and Cerro Moctehuma), as well as the impact of this behavior on intraregional social networks.

Tosa, Paul (Pueblo of Jemez), T J Ferguson (University of Arizona), Matt Liebmann (Harvard University) and John Welch (Simon Fraser University)

[34] *Hemish Migration, Movement, and Identity*

We examine migration, travel, landscape, and place names as key elements of Hemish (Jemez) identity. Language is a key element of Hemish identity, and place names figure prominently in Hemish historical and cultural discourse. The place names that define the footprint of Hemish ancestral territory are associated with the migration that culminated in the occupation of Walatowa and with pilgrimages and land use that take Hemish people back into areas where their ancestors formerly lived. Jemez migration involved movement from the north to the Jemez Mountains, with a few groups later moving from the Jemez Mountains to areas to the south and back, and finally the entire Hemish population moving from large villages in the mountains to Walatowa. The many Hemish ancestral archaeological sites and trails that mark the landscape are physical expressions of past and present land use that figure prominently in the formation and transmission of Hemish identity.

Tosello, Gilles [210] see Fritz, Carole

Towner, Ronald [188] see Renteria, Rebecca

Townshend, Russell [159] see Sampeck, Kathryn

Toyne, Jennifer Marla (University of Central Florida)

[29] *Where Condors Reign: Methodological Challenges in the Bioarchaeology of Chachapoya Cliff Tombs in Peru*

Traditional archaeological practice involves horizontal mapping and excavations of ancient settlements and cemeteries, but bioarchaeological research of mortuary practices in the Chachapoyas region of northeastern Peru is stymied by the challenging vertical slopes, almost constant rain, and the placement of burial structures on seemingly impossible to reach ledges on exposed rock escarpments. Exploring and registering archaeological vestiges of these cliff cemeteries requires the combination of “vertical archaeology”—using rappelling and rope technology to reach tombs as directly as possible to engage in traditional methods of recording using meticulous photography and drawings—and 3D photogrammetry as well as long distance and aerial drone photography. This paper discusses the methods used at the site of La Petaca and Diablo Wasi and the major challenges faced including natural and technological impediments. We attempt to identify and reconstruct how and why the ancient Chachapoya people created and placed their dead using both up close and personal observations as well as remote recording techniques. Many archaeological details cannot be seen from a distance and yet many locations could not be physically reached safely. We continue to explore how to combine these datasets in meaningful and accessible ways for both local and scientific communities.

Trabert, Sarah [339] see Hill, Matthew E., Jr.

Trachman, Rissa (Elon University)**[83] *The Ancient City of Dos Hombres: Material Expressions of Power***

Investigations at the ancient Maya city of Dos Hombres have been guided by an interest in social, political and economic organization, based on architecture and material culture remains. Excavations in the civic ceremonial center of Dos Hombres have been focused in the northern plaza, a very public space that likely was a place of commerce, public ritual and sacred space, thereby the prime backdrop for publicly legitimizing authority. Newly excavated data, especially architectural exposures as well as material culture deposits are presented. These new data are rich with information about public activities and architectural programming at the ancient city. New material culture analyses, including that of the ceramic deposit unearthed from a range structure in the northern plaza are presented. Recent XRF data reveal that most of the obsidian found thus far at Dos Hombres originated at El Chayal, both in the Early Classic and in the Late/Terminal Classic. The resulting lines of evidence delineate various expressions of power by the Dos Hombres polity and elucidate social and economic relationships, both individually and collectively, of the ancient Maya at Dos Hombres and northwestern Belize.

Tramel, Nichole [97] see Schields, Rebekah

Trask, Willa (Defense POW/MIA Accounting Agency), Kristin Hoffmeister (Texas A&M University) and J. Alex Canterbury (Texas A&M University)**[162] *Life and Death in the Southeastern Maya Periphery: Bioarchaeological and Isotopic Analysis of the Uxbenká Burial Population***

The southern Belize region is typically considered geographically and culturally peripheral to the primary activity areas of the ancient Maya. Although researchers have documented the development of a “southern Belize style” in terms of architecture and material culture, to date very little systematic work has been undertaken to understand health, diet, and mortuary behavior in the region. Ten years of excavations at Uxbenká have yielded rich evidence of a continuous occupation spanning from the Late Preclassic to the Terminal Classic, with evidence of human activity at least as early as the Archaic period. Human burials were recovered from a diverse range of civic and residential contexts, providing substantial insight into life and death among the ancient Maya of southern Belize. This paper draws on skeletal, dental, mortuary, archaeological, and isotopic data as a means to investigate health, diet, and mortuary trends at Uxbenká during the span of its occupation. We also identify continuing evidence of ancestor veneration and status disparities reflected in burial practices and mortuary treatments. These studies expand our understanding of the biological consequences of increased social complexity as the Uxbenká polity transformed from a small agricultural community into an important regional geopolitical center.

Traslavina Arias, Abel and Steven A. Wernke (Vanderbilt University)**[75] *Remodeling the Liturgical “Backstage” of the Parish of Santa Cruz de Tuti, Colca Valley (Arequipa, Peru)***

The Toledan resettlement during late decades of the sixteenth century in the viceroyalty of Peru involved a series of changes in the territory for Andean people at different levels, from household to the public and religious spheres. In the case of the reducción (planned colonial town) of Santa Cruz de Tute, the religious sphere was transformed and materialized into a new core of buildings and spaces: the church, its parish, and plazas. The parish and casa cural (rectory) was a liminal space in terms of a very particular form of combined domestic/private/public/sacred functions for clergy and laity. In these terms, its internal organization depended on the set of ideas (a discourse) which to orchestrate people’s daily and liturgical praxis. This paper explores the changes around the parish as a backstage area in this orchestration, and what was involved in its spatial remodeling over nearly three centuries of occupation. To approach this context we use three sources: ecclesiastical text documents, the preliminary results of excavations, and architectural analysis to better understand the physical links between elements and spaces and the modification of movement into and through the parish complex.

Tratebas, Alice (Bureau of Land Management)**[273] *Conservation and Preservation Issues Post Fire***

Wildfire damage to rock art can have long-term effects. Panels may continue to spall over time from the fire damage or from the effects of soluble salts that were activated and spread during the fire. Rock outcrops and slopes may become destabilized after fire denudes vegetation. Panels can be buried or have ashy sediments washed down from the cliff tops above. What happens over time after wildfire kills lichen growing on rock art? Observations and studies following two large wildfires that damaged an extensive petroglyph site provide insights into long range issues in site preservation.

Trautwein, Emily, Stephen Nash (Denver Museum of Nature & Science), Michele Koons (Denver Museum of Nature & Science) and Deborah Huntley (Denver Museum of Nature & Science)**[303] *The Reserve Area Archaeological Project***

Since 2014 archaeologists from the Denver Museum of Nature & Science’s Reserve Area Archaeological Project (RAAP) have conducted survey work in the greater Reserve, New Mexico region. They examined numerous tracts in a range of biomes to better understand the highly variable topographic setting and archaeological settlement patterns, documenting dozens of new sites in the process. After spending a week in the New Mexico site files in Santa Fe in March 2016, the team also spent substantial time and effort re-locating and re-recording many previously (and often poorly) recorded sites in the region. The team’s future research will focus on the Torriete Lakes region north of Reserve, where a single isolated great kiva exists within a broad, high-altitude meadow. Small pueblos scatter the landscape like satellites around the great kiva and appear to encompass both the Reserve and Tularosa Phases. Survey work in 2017 will focus on a more detailed survey of the Torriete Lakes region, hopefully allowing us to parse the comparatively ephemeral Reserve Phase occupation from the more substantive Tularosa Phase occupation. All of this will be done with an eye toward initiating an excavation program in 2018.

Traxler, Loa (University of New Mexico)**[39]** *Foundations to the Late Classic Kingdom: Copan in the Sixth Century CE*

Historical and archaeological data support interpretation of Classic Maya polities as centralized states—strongly integrated organizations with stratified and hierarchical political structures led by rulers wielding coercive power. Yet archaeology is often hard pressed to identify changes instigated by individuals or events, or define watershed moments when particular sites or regions coalesced as states. By the early sixth century CE, the kingdom of Copan had established itself as a dominant player in the southeastern frontier of the Classic Maya world. With control over subordinate polities and trade relations, the royal house had wielded power for over a century laying the foundations for the Late Classic dynasts and their detailed histories. Prior to the strengthening of the state under Ruler 11 (reigned 578–628), Copan's history records a succession of rulers who managed internal growth and likely faced regional population movements and the political challenges that accompanied them.

Trein, Debora (University of Texas at Austin)**[83]** *Power, Space, and Place in the Heart of La Milpa*

La Milpa was one of the largest ancient Maya urban centers in the eastern Maya Lowlands during the second half of the Late Classic to the Terminal Classic periods, its influence extending over communities throughout the Three Rivers Region of northwestern Belize. La Milpa's rise to regional prominence is associated with a series of upheavals during this period, including increased political dynamism following the decline of Tikal at the end of the Early Classic period, and a dramatic rise in the population of the Three Rivers Region. In this presentation we provide a synthesis of the research conducted over the past ten years at La Milpa, utilizing multiple datasets to chart the cultural trajectory of this large urban settlement. Further, we explore ways in which the residents of La Milpa and surrounding communities may have articulated their position in the region through the design, access, and use of the built environment of La Milpa. We suggest that La Milpa's architecture provided an arena for members of the La Milpa polity to interact with one another and negotiate changing social, political, economic, and environmental conditions in the region, through both extraordinary events as well as mundane activities.

[83] *Chair*

Trein, Debora [83] see Valdez, Fred

Tremain, Cara G. (University of Calgary)**[310]** *The Many Lives of Maya Antiquities: Tracking Distribution and Redistribution through Auction Catalogues*

Glossy sales catalogues published by high-end auction houses present a seemingly endless supply of antiquities for purchase from around the world. These catalogues offer insight into market trends and allow the volume of antiquities being bought and sold at auction to be monitored. At a time when the internet auction market is growing, and the publication of information in catalogue form is declining, it is important to record and share data from available sales catalogues. This paper presents the results of a systematic study of Maya antiquities at auction, using sales catalogues that cover a period of more than 50 years. Quantitative studies of auction catalogues are useful for understanding the volume of antiquities that have been bought and sold at auction; the types of antiquities that are more vulnerable to looting and forgery; and whether the market is becoming more or less opaque with respect to provenance. Studies such as these, although time consuming and hampered by the difficulties of accessing information, are important for an understanding of the past and current market in antiquities.

[310] *Chair***Tremayne, Andrew H. (National Park Service) and William Brown (University of Washington)****[190]** *Mid-Late Holocene Population Trends and Maritime Resource Intensification in Western Alaska*

Population growth has long been argued to play a critical role in promoting cultural evolution, operating both through adaptation to population pressure and increasing social network size and transmission frequency. We present a model of mid-late Holocene Alaskan population size based on a temporal frequency analysis of 902 site occupation episodes dating between 6000 and 1000 radiocarbon years BP, with two objectives: 1) identify factors that influenced Alaskan population dynamics over this interval, and 2) bring these to bear on our understanding of the cultural transition from the Arctic Small tool tradition (ASTt) to the Norton tradition. To evaluate the influence of environmental factors and population size on future population growth and cultural change, we regress growth rates derived from our population model on 1) GISP2 temperature data; 2) the 3600 cal BP Aniakhak eruption; and 3) the population model itself. Paradoxically, the ASTt-Norton transition, which apparently increased cultural complexity, transpired during a sustained low-population interval driven by the eruption and extreme temperatures. We tentatively resolve this paradox by suggesting that severe subsistence stress entailed by these environmental factors encouraged late ASTt communities to shift focus from terrestrial to marine resources, promoting technological innovations to better exploit the marine habitat.

Tremayne, Andrew H. [173] see Buonasera, Tammy

Tremblay, Anna (Pennsylvania State University) and Daniel E. Ehrlich (Dickinson Excavation Project and Archaeological Su)**[234]** *7 × 105 Dimensions of Pottery: Multivariate Analyses of Pottery Assemblages from the Lower Town Site of Mycenae, Greece*

During excavation, it is often safer to record areas separately and later identify associations between strata across a site. Such practice waits until detailed analyses can be conducted and avoids erroneously comparing material from separate depositions. However, the process can lead to more identified strata than are truly present. This project considered relative frequencies of pottery fabrics as a multivariate dataset to characterize and analyze site formation at the Lower Town site of Mycenae, Greece. Mahalanobis distance (D₂), hierarchical clustering, and principle components analysis were used in order to quantitatively assess 841 pottery units. These units, on average containing 215 sherds, represent 41.7% of all pottery recovered during the multiyear excavation. Dendrograms and Multidimensional Scaling were used to visualize distances and clusters in order to characterize relationships between the 416 individually named strata on site. Data showed high degree of patterning and formed between 7 and 54 groups. This method proved highly effective in identifying putative associations across a large site. Importantly, this method does not require whole or decorated ceramic material, can be calculated relatively quickly, and is sensitive to detecting relatively small differences in assemblages.

Trever, Lisa [134] see Tripcevich, Nicholas

Treyvaud, Geneviève [178] see Auger, Réginald

Triadan, Daniela (University of Arizona)
[329] *Discussant*

Triadan, Daniela [236] see MacLellan, Jessica

Tricarico, Anthony (University of South Florida)
[93] *Discussant*

Trigg, Heather (University Massachusetts Boston)

[128] *An Exploration of Indigenous Participation in Spanish Economic Activities in Seventeenth-Century New Mexico*

When the viceroy of New Spain gave permission for the establishment the colony of New Mexico in the late sixteenth century, he acknowledged the importance of indigenous people to the colonial enterprise, urging the governor to treat indigenous Pueblo people kindly so that they would work for the colonists. The Spanish colonists' economy largely consisted of the barter of subsistence goods. Throughout the seventeenth century, Pueblos and other indigenous peoples both engaged and were integrated into the colonial economic activities in various contexts and in various ways. Pueblos were forced to provide labor for construction and agricultural pursuits, and they were obliged to pay tribute in goods that were commonly used in the barter economy. Yet, the production and exchange of certain items appears to have been controlled by the Pueblos. In this paper, I address the intersection of indigenous activities and Spanish colonists' economies. An archaeological perspective of colonists' households along with documentary data illustrates some of the ways indigenous peoples participated, both voluntarily and coerced, in economic activities. These interactions ranged in scale from daily household activities that were informally negotiated and contextualized to more formal economic structures regulating tribute and long distance trade.

Tringham, Ruth (University of California-Berkeley)

[172] *Closely Observed Layers: Small Stories and the Heart*

When I tell people I'm an archaeologist, their eyes light up with a wistful look and they say "I've always wanted to be an archaeologist." I could describe one reality, that it is not as glamorous as they think, work is slow and repetitive, and that leaves them disappointed. But usually I describe another reality: what I love about what I do—and they are delighted. However, I have never articulated it in a professional presentation or publication: I excavate layers of dead people's residential debris; my trowel gradually reveals the thousands of events that have created the layers and material fragments of past lives. Meanwhile, my mind is joyfully busy inside my head, making sense of the layers, using all my senses and intuition to plan where my hands-with-trowel should go next, respectfully fearful of the responsibility of the decision. At the same time my mind buzzes with all the small stories that rise up out of the debris of the dead residents. This presentation, inspired by the writing of George Saunders, will find the heart in the specifics of the archaeological record and the slow versioning of their myriad stories from source to sharing with the world.

[37] *Discussant*

Tringham, Ruth [70] see Ashley, Michael

Trinh, Sabrina [29] see Meyer, Dominique

Trinidad-Rivera, Gelenia (University of Puerto Rico—Rio Piedras Campus)

[289] *The Jácenas Archaeological Collection: Laying Down the Facts*

While researching an archaeological collection, it is important to trace its history in terms of its origins, what makes up the collection, where it is located, and who is responsible for it. Jácenas, a precolumbian site in Ponce, Puerto Rico, was excavated during the first decade of the twenty-first century. The fieldwork was carried out by a nonlocal cultural resources management company under contract with the United States Corps of Engineers (USCE). Among the many concerns expressed by local archaeologists was the fact that the collection was taken to the United States for analysis. In 2013, the Jácenas collection was transferred to the Museo de Arte, Historia y Antropología, of the University of Puerto Rico, Rio Piedras campus. This paper will outline the history of the Jácenas collection using the records and documentation provided by the USCE to the Museum, and concentrate on the transfer process. What archaeological materials were transferred? What type of fieldwork and laboratory documentation exists? How was the collection catalogued? This investigation wants to provide the general public with an understanding of what materials are available for future research projects.

Triozzi, Nicholas, Anna Semon (UNC Chapel Hill/American Museum of Natural History) and Thomas Blaber (American Museum of Natural History)

[365] *Causes and Consequences of Pre- and Protohistoric Social Network Connectedness in Coastal Georgia*

This poster considers social networks derived from artifact assemblages and interment types from early-Irene and late-Irene and protohistoric mortuary contexts on the Georgia (USA) coast. Network analysis can be used to evaluate potential interactions between community members represented in mortuary contexts. The R statistical program is used to model social networks according to multiple parameters and generate statistical indices of network connectivity. I propose that these indices are a function of external forces (e.g., political and economic pressures, or dramatic changes in climate) acting on connections among individuals in a community and between geographically separated, but culturally affiliated communities. If intersite, cross-temporal, social networks can be demonstrated from artifact assemblages, then the connectivity of each network may be consequences of, or causal to micro-regional external forces. The historic, archaeological, and paleo-climatic records frame this interpretation of network connectivity.

Triozzi, Nicholas [365] see Blaber, Thomas

Tripevich, Nicholas (UC Berkeley), Lisa Trever (UC Berkeley), Chris J. Kennedy (UC Berkeley), Eric Kansa (Alexandria Archive) and Michael D. Glascock (University of Missouri)

[134] *Open Obsidian Geochemistry Visualization System for the Andes*

Obsidian sourcing studies that provide valuable insights into archaeological mobility and interaction are enhanced by the availability of geochemical analyzers, and especially by the proliferation of portable X-ray fluorescence units. This year we are introducing an open-source system for analysis of geochemical datasets available in web-based repository and based on R-Shiny, a browser based analysis and visualization system built on the R project. The Andean Geochemistry data archive, a new project hosted at OpenContext, combined with the R-shiny based analysis system, allows

researchers to explore geochemical data interactively. We have uploaded a number of geochemical datasets from the Andes to demonstrate the effectiveness of this approach when many datasets are available in a given area and to encourage more researchers to share their data in an open framework. While there remain obstacles to productive comparison of geochemical data in a given region, including problems with inter-instrumental comparability in particular, this system provides an architecture for sharing and visualizing these data in an open format to foster greater comparison between projects going forward.

Tripcevich, Nicholas [88] see Capriles, José M.

Trites, Andrew (UBC Marine Mammal Research Unit) and Frances Robertson (UBC Marine Mammal Research Unit)

[387] *Archaeological Data from Washington State Indicate That Northern Fur Seals Will Likely Once Again Be a Dominant Predator in the California Current System*

Northern fur seals (*Callorhinus ursinus*) of all ages (pups, juveniles, bulls and adult females) dominate the mammal assemblage of prehistoric (prior to 1850) coastal middens from California to Alaska. We reviewed archaeological data, historical documents on the early fur trade, as well as more recent data on fur seal genetics and migratory patterns of fur seals—and discovered that most of the fur seal remains in Washington State middens likely originated from a very large colony of northern fur seals that Russian sealers extirpated from the Farallon Islands (California) in 1840. Additional fur seal remains likely originated from the Bering Sea (Alaska). Prehistorically, native hunters regularly traveled 50 km or further offshore in open canoes during the winter and spring migration of northern fur seals along the continental shelf break to obtain fur seals (and other species). We hypothesize that sealing likely led to the development of exceptional seamanship and was the stepping stone to whaling. The data we compiled further indicate that fur seals were once a dominant species in the California Current system, and that they are likely to again dominate this ecosystem now that they have reestablished a breeding colony on the Farallon Islands.

Trites, Andrew [378] see Robertson, Frances

Troncoso, Andrés

[375] *Why Did People Begin to Make Rock Art? A Case Study from North-Central Chile*

The origin of rock art has frequently asked from an evolutionary and cognitive perspective to understand the dawn of making images in the Paleolithic. But in many regions of the world the beginnings of rock art production occurred later. North-central Chile is one of these places. In this area, the practice of marking and chipping rocks surfaces started around 2000 BCE in coherence with the transition from the Middle to the Late Holocene and the start of many transformations in the hunter-gatherer's way of living. Our paper approaches this question, discussing how this new practice and materiality in the start of rock art in the area was a result of new relationships with the world, landscapes and the substances that composed it.

Troncoso, Andrés [143] see Méndez, César

Troskosky, Christopher B. [90] see Ruhl, Erika

Trousdale, William B. [297] see Allen, Mitch

Trudeau, Nicholas, James Torpy (University of Michigan) and Travis Williams (University of Michigan)

[89] *Preliminary Analysis of Archaic Lithic Material from the Murrell Home in Cherokee County, Oklahoma*

In 2016, excavations at the George M. Murrell Home, a mid-nineteenth-century plantation home located in northeastern Oklahoma, yielded a number of chipped stone artifacts attributable to the Archaic period. Abandoned during the Civil War, the Murrell home is currently owned by the Oklahoma Historical Society and run as a living history museum and park. Located near the confluence of three major waterways, the site lies in an ecotone between broadleaf forests and prairie parkland. The lithic assemblage includes both finished tools and flaking debris made from local material as well as material from other locales. Agriculture has disturbed and decontextualized many of the recovered artifacts, and remote sensing failed to reveal any features which might be associated with the site. This study presents an analysis of the chipped stone assemblage in an effort to determine the role of the site, estimate the duration of occupation, and identify potential linkages to nearby contemporary sites.

Truex, Lise (University of Chicago)

[297] *Working for the Palace, Working for the House: How Households Became a Neighborhood in Late Third Millennium BC Tell Asmar (Ancient Eshnunna), Iraq*

To test the value of the neighborhood concept in archaeological practice, this paper relies on a model of socioeconomically diverse, urban Mesopotamian neighborhoods and tests the model by analyzing households within a neighborhood at Tell Asmar, Iraq. Tell Asmar became one of several major urban settlements in the Diyala River region, with occupation of the site extending back into late prehistory. The dataset comprises a subset of archaeological evidence recovered from the Tell Asmar Northern Palace and Private Houses Area by the 1930s Diyala Expedition excavations and concentrates on late third millennium BC occupation levels, architecture, artifacts, and ancient texts. Using methods of household archaeology to reconstruct household wealth, this paper investigates household artifacts and their findspots within houses, making inferences about activities taking place in different household loci. An analysis of several houses compares households with life cycles spanning the late third millennium BC with late Akkadian households that appeared alongside the architectural reorganization of the Northern Palace. By reconstructing households in the context of the material culture of the Early Dynastic city-states and the Akkadian state, this paper shows how households functioned as a neighborhood, one experiencing growth, decline, and resurgence connected to broader socioeconomic and political developments.

Truhan, Rebekah (University of Iowa), Jacob Foubert (University of Iowa) and Luke Stroth (University of California, San Diego)

[342] *Technological Approach to Fire-Cracked Rock*

Fire-cracked rock (FCR) is an artifact category that has not received much attention, normally reduced to counts and weights. However, FCR is a dynamic material that undergoes a specific sequence of changes. In this poster, the authors propose different "stages" corresponding to different hot rock technologies and features, such as hot rock cookery, hearths, and limestone temper. An experiment is designed to identify the physical and geochemical changes that occur during hearth construction and maintenance, and a methodology is proposed to identify those changes in the

archaeological record. Using the archaeological assemblage of FCR from Woodpecker Cave, a Late Woodland rockshelter, we are able to use physical and geochemical changes combined with ethnographic analogy to show the sequence of maintenance behaviors performed on a hearth feature.

Truhan, Rebekah [342] see McGrath, James

Trusler, Kate (University of Missouri)

[282] *Evaluating Socioeconomic Status at Maasplein Using Food Utility Indices*

A number of researchers have inferred socioeconomic status using zooarchaeological data in contexts suggested by artifacts to reflect a particular status level. Cuts of meat that are of relatively high yield ("utility") should be more economically valuable than low yield parts. A model of carcass-part utility assumes that people of high socioeconomic status will preferentially acquire greater relative frequencies of high yield parts than people of low status. The model is applied to the Roman town site of Maasplein, the Netherlands, using a food utility index for cattle (*Bos Taurus*). Results indicate that there are relatively more low yield parts, reflecting low status. This test of the model demonstrates that food utility indices in conjunction with other contextual data can be used to identify socioeconomic status.

Tryon, Christian (Harvard University), Nick Blegen (Harvard University) and Tyler Faith (University of Queensland)

[389] *The Scatter between the Scatter between the Patches: A Tephrostratigraphic Approach to Low-Density Archaeological Sites in the Eastern Lake Victoria Basin of Kenya*

Among recent groups, foraging activities are unevenly distributed across the landscape. Archaeological traces of past foragers are also spatially variable as a result of multiple factors, including the redundancy of site use, a bias toward tasks that leave well-defined material traces likely to preserve into the present (e.g., stone tool manufacture), and local sedimentological factors that mediate site preservation through burial as well as subsequent recovery through erosion or excavation. Landscape-scale studies of past foragers do not provide ethnographic snapshots of the past, but rather recognize and use the time-averaged nature of the record. Widespread deposits of volcanic ash, or tephra, are particularly useful in this context, particularly as stratigraphic markers. As the products of a single eruption, tephras are chemically distinct, amenable to direct chronometric dating and can bury paleolandscapes as well as surface and subsurface archaeological and paleontological sites. We use multiple widespread Late Pleistocene tephra deposits exposed in outcrops around the eastern margin of Lake Victoria to constrain and guide our examination of spatial variability in Middle Stone Age artifacts, fossil fauna, and depositional environments in a region that, while dominated by the largest lake in Africa today, was an expansive grassland in the past.

Tryon, Christian [371] see Niespolo, Elizabeth

Tsang, Chenghwa [36] see Cruz Berrocal, Maria

Tserendagva, Yadmaa [360] see Farquhar, Jennifer

Tsesmeli, Evangelia (Southern Methodist University) and David Eck (New Mexico State Land Office)

[366] *Eligible Recommended Archaeological Sites? Biases and Caveats: A View from New Mexico*

Eligibility of an archaeological site in the National Register is determined on four basic criteria. This research discusses the nature of eligible nominated sites in regard to their temporal and spatial affiliation on New Mexico State Trust Lands as they are recorded in the New Mexico ARMS database. Correlations with available archaeological surveys, terrain visibility, and the way we regard and define what an archaeological site is are also examined.

Tsouras, Theodore (Logan Simpson), Michael L. Terlep (Logan Simpson), David Lewandowski (Logan Simpson) and Wesley Gibson (Logan Simpson)

[301] *The Site as a Moving Target: 40 Years of Change on the Dynamic Landscape of Black Mesa*

In the context of surface archaeological inventory, sites are typically regarded as static entities about which numerous inferences can be made regarding function, temporal affiliation, and potential for subsurface deposits. These inferences are often the primary tool used to inform National Register of Historic Places eligibility recommendations, as well as guide testing and/or data recovery strategies ahead of various development or other federal undertakings. In many regional areas and with many site types, this process can be more or less straightforward. In areas subject to intense erosion and/or deposition, and with certain site types—specifically, small artifact scatters—the process can become more complicated. Comparing previous survey and testing data from the Black Mesa Archaeological Project (BMAP) conducted between 1967 and 1983 with almost 4,000 acres of recent survey by Logan Simpson of the same area, this poster examines the effects of approximately 40 years of erosion and deposition on the surface manifestation of small artifact scatters on Northern Black Mesa, Arizona.

Tsouras, Theodore [155] see Lewandowski, David

Tsui, Jamie and Liye Xie (University of Toronto)

[91] *Quantitative Use-Wear Analysis with ImageJ*

Traditional use-wear analysis is mostly subjective and requires considerable experience. Researchers have tried image analyzing software to quantify use-wear patterns; however, the cost of software and the lack of training to use the software made common adoption of the approach less practical. In this research, we tested the open-source software ImageJ for use-wear measurement in two-dimensional images. The results show that the software can reliably quantify the polish development, the polish microtopography, and the dimensions and numbers of worn areas in image samples taken from both experimental and archaeological specimens. Compared to the software previously employed in two-dimensional quantitative use-wear analysis, ImageJ has the advantage of being a free, public domain software which also allows developers around the world to create plug-ins to meet specific research needs. With this software, it is now possible to popularize quantitative use-wear analysis, even for the use-wear images taken in past, traditional use-wear projects.

Tsutaya, Takumi (Kyoto University)

[330] *Feeding Ecology of the Okhotsk Hunter-Gather-Fishers Estimated by Stable Isotope Analysis*

Hamanaka-2 site in the Rebun Island, Hokkaido, Japan, provides a good faunal assemblage made by Epi-Jomon and Okhotsk hunter-gatherer-fishers. In this study, we reconstruct feeding ecology of the Okhotsk hunter-gatherer-fishers by applying the stable carbon and nitrogen isotope analysis to faunal and human remains from the Hamanaka-2 site. As a result of the analysis, Okhotsk humans were at the highest trophic level among the mammals, domesticated dogs indicated the similar but slightly lower isotope ratios with humans, and domesticated pigs indicated the varying isotope ratios between marine and terrestrial endpoints. Isotopic mixing model suggested that the main protein sources of the Okhotsk humans are dogs and marine mammals, those of the domesticated dogs are marine mammals and fishes, and those of the domesticated pigs are C3 terrestrial and marine food sources. Although the dogs indicated no chronological change in the isotope ratios, the carbon and nitrogen isotope ratios of the pigs appeared to increase through the time. The results of this study will provide a new insight into the feeding adaptation of ancient northern hunter-gatherer-fishers to subsist in the island environment.

[30] *Discussant*

Tucker, Carrie, Nelda I. Marengo (University of California, Riverside), Ashuni E. Romero Butrón (E. Nacional de Antropología e Historia), Dominique Rissolo (University of California, San Diego) and Jeffrey B. Glover (Georgia State University)

[44] *Vista Alegre: Recent Excavations of an Ancient Maya Port Site along the North Coast of Quintana Roo, Mexico*

The Proyecto Costa Escondida (PCE) has undertaken investigations along the north coast of Quintana Roo, Mexico, since 2006. In this paper we present results of the 2016 field season, which was focused on the small island port site of Vista Alegre. The 2016 field season at the site had two main objectives. One was to document the extent and scale of human modification at Vista Alegre. The second was to investigate distinct architectural groups at the site to better understand their chronology. To meet the first objective, an E/W transect of 1 m × 1 m test units was excavated providing a view of the island in profile. The second goal was met by placing excavations into three platforms at the site. The architectural characteristics documented allows us to investigate the similarities and differences between these architectural groups, such as: their orientation, method of construction, materials used, and how they were finished. In short, this field season provides a better understanding of the site's chronology and how Vista Alegre's inhabitants interacted with other parts of the Maya world from the Middle Preclassic through the Postclassic.

Tucker, Gregory (University of Michigan)

[312] *Discussant*

Tuna, Numan [240] see Daniels, Megan

Tune, Jesse (Department of Anthropology, Fort Lewis College), Heather L. Smith (Department of Anthropology, Eastern New Mexico University) and Stephen Yerka (Department of Anthropology, University of Tennessee)

[184] *Younger Dryas Fluted Technologies: A Comparison of Folsom, Cumberland, and Barnes Technologies*

The transition from Clovis fluting techniques to the variety of later Paleoindian fluting methods and fluted-point morphologies represents one of the earliest major technological shifts currently known in North America. This transition generally coincides with the beginning of the Younger Dryas, and much speculation exists concerning potential correlations between changes in environmental factors and Paleoindian technologies. Some researchers argue that late Pleistocene ecological transitions and subsequent variation in fluted-point technologies demonstrate early stages of cultural regionalization as people began to adapt to local environments. In turn, this regionalization led to the emergence of "full-fluted" technologies during the Younger Dryas such as Folsom in the Great Plains, Cumberland in the Midsouth, and Barnes in the Great Lakes regions. Here, we present an assessment of morphological and technological attributes observed on samples of Folsom, Cumberland, and Barnes points to identify degrees of homogeneity in technological traits. Discussion will address the potential for historical relatedness, regionalization, and independent invention, as well as correlations with Younger-Dryas era environmental proxies.

Tung, Burcu (Catalhöyük Research Project)

[73] *Excavation Narratives and Reflexive Practices at Çatalhöyük*

A microcosm in itself, The Çatalhöyük Research Project has, in one way or another, intellectually, emotionally and physically altered the lives of its members. The project ethos, in turn, has changed through time with the dynamics that surround research and managerial practices of the individuals making its body. Further the project has been part of a local landscape enduring sociopolitical changes within Turkey. As a member of the Çatalhöyük Research Project since 1997, in this paper, I reflect on the practicalities of the Project's reflexive excavation methodologies. I explore the different narratives that have structured the excavation methodologies of the different teams engaged in the project. I bring my perspective, as a female Turkish archaeologist, to the challenges that have been faced, the opportunities that may have been missed, and the accomplishments that have been made in lieu of the competing expectations held by different team members.

Tung, Tiffany A. (Vanderbilt University, Department of Anthropology)

[364] *Documenting the Forced Migration of Enslaved Peoples at the Grassmere Plantation, Nashville, Tennessee, Using Strontium and Lead Isotope Analyses*

The Grassmere Plantation in Nashville, Tennessee was established in 1810, and documents show that unnamed, enslaved peoples labored there throughout the decades until emancipation. Our research investigates whether enslaved laborers were born and raised on the plantation or were forcibly moved there later in their lives. To address that question, we analyzed strontium and lead isotope ratios from tooth enamel. Twenty burials were recovered from Grassmere, and we obtained strontium and lead isotope ratios from 12 teeth representing 10 of those individuals. The strontium isotope ratios range from 0.70963 to 0.71303 and the mean $87\text{Sr}/86\text{Sr}$ = 0.71097. For lead isotopes, the $206\text{Pb}/204\text{Pb}$ range is 18.4 to 21.5 (mean = 20.3); $207\text{Pb}/204\text{Pb}$ range is 15.6 to 15.9 (mean = 15.8); and $208\text{Pb}/204\text{Pb}$ ranges from 38.4 to 41.1 (mean = 40). Independent verification of local strontium and anthropogenic lead ratios remains to be determined; however, the observed range and cluster of these data strongly suggest there were two, perhaps three, different geographical origins represented by the 10 individuals. This is consistent with oxygen isotope data, with $\delta^{18}\text{OVPDB}$ values that range from -2.6 to -6.1. Together, the isotope data suggest that several of the individuals were probably purchased at slave markets later in life and forcibly relocated to Grassmere.

[147] *Discussant*

Tung, Tiffany A. [143] see Poulson, Simon

Turmubaatar, Tuvshinjargal [114] see Barton, Loukas

Turner, Andrew D. (Yale University) and Rex Koontz (University of Houston)**[179]** *The Late Classic Ballgame and Cross-Cultural Interaction at Xochicalco, El Tajín, and Copán*

The proliferation of ball courts at major sites such as El Tajín and Xochicalco during the Late Classic period suggests that the Mesoamerican ballgame and its associated architectural features played a crucial role in the expression of power and identity in the tumultuous centuries that followed the collapse of Teotihuacán. This paper investigates the role of Late Classic ball courts in fostering, shaping, and manifesting cross-cultural interaction through focus on sites from three different regions: Xochicalco in Central Mexico, El Tajín on the Gulf Coast, and Copán in the Southern Maya Lowlands. While several earlier scholars have noted distinct similarities in ballgame art and architecture shared among these sites, they have been hesitant to explain how and why such features should be shared across vast distances. As focal points of public ritual and spectacle, ball courts served as spaces that mediated cross-cultural interaction, and may have been constructed in part to impress visiting dignitaries or merchants from distant allied or rival polities. Likewise, similarities in ballgame architecture and associated artistic embellishment could signal mutual affiliation to foreign visitors, and thus may have been prone to emulation among different cities.

Turner, Michelle (Binghamton University) and Ruth Van Dyke (Binghamton University)**[373]** *The Archaeology of Aztec North*

Our paper reports on our recent archaeological testing at the previously unexcavated Aztec North great house at Aztec Ruins National Monument. Standing on the river terrace behind and above the better-known valley great houses, Aztec North is out of sight of those great houses but tightly bound to them as part of the formalized cultural landscape of Aztec Ruins. It is a crucial site for understanding the development of Chaco Canyon's outliers, as it was likely the earliest great house built in what eventually became the enormously ambitious outlier complex of Aztec Ruins. Our investigations revealed architectural surprises, including unexpected construction methods that bring into question archaeologists' traditional dichotomies between Chacoan building methods and methods of local emulation. And even as the site revealed little evidence for intensive use, we found signs of significant remodeling. Our artifact analysis is also adding to our understandings of the site's chronology, of the use of materials from near and far, and of subsistence practices at this site. We will discuss our results, drawing on broader understandings of Chacoan expansion, and with consideration of how Aztec North relates to the greater cultural landscape of Aztec Ruins, to Chaco Canyon and to other regions.

Turner, Nancy [77] see Armstrong, Chelsey Geralda

Turner, Nancy J. [77] see Jackley, Julia

Turney, Kathryn (University of Arizona)**[106]** *Oral History and Ethnoarchaeology at Wupatki National Monument*

The history between the Wupatki Basin Navajo, the National Park Service, and various local ranchers has resulted in the Navajo being driven from this part of their ancestral homelands. The results led to loss of land and connection to family members, some of whom were driven across the Little Colorado River and formed new settlements. My research this summer has been to chart the genealogy of the Wupatki Navajo and extended family, visit Navajo sites within the Flagstaff National Monuments and employ spatial analysis of family dwellings and sheep herding areas within the park. I want to generate a better understanding of the importance of land use and loss and how it is related to the Navajo philosophy of K'e and K'ei.'

Tushingham, Shannon (Washington State University) and Robert Bettinger (UC Davis)**[383]** *Diversity and Development of Property Rights and Money in the Southern Pacific Northwest Coast*

At contact, property rights systems in northwestern California and southwestern Oregon were complex and diverse, and applied to a wide range of sacred places and items as well as use rights to foods and materials associated with a highly productive (yet very patchy) resource base. Use rights and possession extended from property that was commonly owned (e.g., game, line fishing locations) to individually owned property (e.g., productive salmon weir locations and acorn groves, dance rights, formulae). Individually owned items were easily negotiated with money, while other property less so. Despite similarities with the northern/central NWC, resource privatization was the norm, and household production remained on the family level operating within the "sweathouse group." Property rights and human-environmental relationships changed fundamentally at 1300 BP when plank house villages spread throughout the region. This time is characterized by a rapid, qualitative shift in adaptive strategies—including an expansion in diet that included back loaded staples (e.g., salmon) in addition to previously intensified front-loaded foods (e.g., acorns)—and likely involved an expansion and/or formalization of money use, resource privatization, and individually negotiated items.

Tushingham, Shannon [173] see Buonasera, Tammy

Tuvshinjargal, Tumurbaatar [114] see Case, Nicholas

Tykot, Robert H. (U. of South Florida), Kyle Freund (Indian River State College) and Andrea Vianello**[178]** *The Social Dynamics of Obsidian Use in the Prehistoric Western Mediterranean: Temporal Changes in Maritime Capabilities, Lithic Technology, and Sociopolitical Complexity*

In the western Mediterranean, obsidian was an important lithic material, coming from four Italian islands and found at archaeological sites up to several hundred kilometers away. Analytical studies of many thousands of artifacts have identified their specific geological sources, and revealed chronological and geographic changes in their selective use through the Neolithic and Bronze Ages (ca. 6000–1000 BC). These data are used to assess economic and social dynamics regarding access to and territorial control of the sources, and the production and distribution of obsidian cores and tools. We specifically compare the social dynamics of obsidian usage from the large island of Sardinia with that of the small island of Lipari, for several time periods. Elemental analysis of artifacts and identification of specific geological subsources for each island is well established, while the use of a nondestructive portable XRF in museums and other facilities over the last decade has tremendously expanded the number of artifacts tested. The variables addressed include the quality, quantity, and accessibility of the raw material; technological developments and specialization in lithic artifact production; and socioeconomic changes from early farmers in the Neolithic to complex societies in the Bronze Age.

Tynan, Justine [196] see Duffy, Paul R.

Tys, Dries [282] see Leonard, Alison

Uceda, Santiago, Henry Gayoso (Proyecto Arqueológico Huaca de la Luna—UNT), Feren Castillo (Proyecto Arqueológico Huaca de la Luna—UNT), Enrique Zavaleta (Proyecto Arqueológico Huaca de la Luna—UNT) and Carlos Rengifo (Proyecto Arqueológico Huaca de la Luna—UNT)
[170] *Los cambios climáticos y sociales una ecuación positiva: Los datos en el complejo arqueológico de Huacas del Sol y de la Luna*

Los antiguos estudios sobre la cultura Moche, o Mochica, consideraban que un mega Niño (550–600 dC) fue la causa del abandono del sitio y el traslado de la capital Moche a Galindo. Los datos recuperados en los últimos 25 años en el complejo arqueológico Huacas del Sol y de la Luna ofrecen una secuencia ocupacional casi continua desde el siglo I dC hasta el siglo XIV. Durante este tiempo se han identificado tres grandes periodos: los dos primeros corresponden a la ocupación Moche y el tercero post-Mochica. Un cambio brusco en la estructura social y política Moche hacia el siglo VII se registra en asociación con el abandono del Templo Viejo de Huaca de la Luna y la construcción de un nuevo edificio, aunque menos imponente. Al mismo tiempo y contemporáneo con el Templo Nuevo, la Huaca del Sol pasa de ser una importante residencia a un verdadero palacio. En base a esta evidencia, este trabajo explora una reinterpretación del impacto del fenómeno El Niño, en contraposición a las hipótesis propuestas en la década de 1970, muchas de ellas aún persistentes.

Uchiyama, Junzo [371] see Gillam, Christopher

Ueda, Kaoru (Boston University) and Ellen Hsieh (UCLA)

[36] *Navigating through Asian Waters: Comparative Study of Seventeenth- and Eighteenth-Century Porcelain Trade in Manila, the Philippines, and Banten, Indonesia, from an Archaeological Perspective*

The trade networks in seventeenth- and eighteenth-century Southeast Asia are often reconstructed by using European historical sources. As a result, Southeast Asia is frequently portrayed as a way station between Europe and China. However, the comparative study presented here between Ayuntamiento de la Spanish government site in Manila, the Philippines, and indigenous palace sites in Banten, Java, Indonesia, under Dutch indirect rule suggests a far more complex picture and challenges the traditional understanding of the Euro-Asian porcelain trade as well as the Eurocentric power relationships in early modern Asia. The results of our study unveil the strong presence of Chinese merchants' activities among the regional maritime networks. A sizable amount of Japanese trade porcelain found in Ayuntamiento suggests that the privilege bestowed to the Dutch as the sole Western trading partner in Japan was effectively violated by trade through Chinese merchants particularly via Formosa (Taiwan). Moreover, the distinct porcelain distribution patterns between the two indigenous palaces in Banten suggest the dynamic agency of the locals and help fill the gap in an under-documented aspect of Euro-Asian porcelain trade.

Uehlein, Justin [336] see Thurber, Hali

Uesugi, Akinori [167] see Vasantha, Rajesh

Ullah, Isaac (Arizona State University)

[268] *Moderator*

[268] *Discussant*

Ullah, Isaac [191] see Banning, Edward

Ullinger, Jaime [196] see Ramireddy, Pranavi

Ullinger, Jaime [151] see Tarquinio, Daniella

Underhill, Anne P. (Yale University), Fengshi Luan (Shandong University) and Fen Wang (Shandong University)

[76] *Variation in Large Sites from the Longshan Period of Northern China*

Recent research does not support the common view that the numerous large sites from the Longshan period of northern China ca. 2500–1900 BC represent a homogeneous type of settlement with respect to developmental process, scale, and organization. Most publications regard these large settlements as cities and expect they share specific features indicative of organizational homogeneity. The focus has been on large Longshan and later, early Bronze Age settlements in Henan province. We discuss variation in scale and organization of large sites located in the eastern seaboard area of Shandong and northern Jiangsu provinces. On the basis of our collaborative excavation at Liangchengzhen in southeastern Shandong, we argue that a particular challenge for understanding the nature of large Longshan settlements is the need for more extensive excavations and diachronic data revealing changes in scale and organization over time.

Unger, Jiri [189] see Kvetina, Petr

Uomini, Natalie (MPI-SHH, Jena)

[313] *Moderator*

[313] *Discussant*

Ur, Jason (Harvard University)

[76] *Mesopotamian Megasites before Uruk*

Discussions of “alternative” trajectories of urban growth are often compared to “classic” models from Old World civilizations, and most often Mesopotamia. It is said that Mesopotamian cities were dense and spatially discrete from their agricultural hinterlands, in contrast to new models of low-density urbanism. In fact, the earliest large settlement agglomerations (“megacities”) in Mesopotamia were discontinuous and far less dense than the mature cities of the Bronze Age (after 3000 BC). This paper describes two such early sites, Tell Brak and Khirbat al-Fakhar (Hamoukar), both of which

grew to large spatial (and possibly demographic) scale centuries before Uruk. Rather than seeing them as experiments that failed, this low-density "proto-urban" phase of the late fifth–early fourth millennium BC was on a trajectory toward the classic Mesopotamian urban model, one that archaeologists have failed to recognize due to methods and taphonomic factors.

Urban, Thomas (Cornell University), Linda Chisolm (U.S. National Park Service), Sturt Manning (Cornell University), Jeffrey Rasic (U.S. National Park Service) and Andrew H. Tremayne (U.S. National Park Service)

[257] *Geophysical Investigations of Archaeological Sites in Alaska's National Parks and Preserves: 2016 Field Season*

Alaska's National Parks and Preserves have seen increased use of geophysical methods for cultural resource management and archaeological research in the past several years. Here we describe the results of geophysical surveys conducted at several of Alaska's National Parks and Preserves in the summer of 2016 as part of an ongoing effort that has span several field seasons and has now included eight parks and preserves. Examples from 2016 include research at Gates of the Arctic National Park and Preserve, Bering Land Bridge National Preserve, and Katmai National Park and Preserve. Our results include successful examples of detecting hearths and campfires with magnetic methods as well as detecting and mapping semi-subterranean houses with ground-penetrating radar (GPR). We also test the possibility of using GPR for snow and ice patch archaeology. As resource management and research tools, our work has shown geophysical methods to be highly effective in these contexts.

Urcid, Javier (Brandeis University), Arthur Joyce (University of Colorado, Boulder) and Sarah Barber (University of Central Florida)

[82] *More Carved Monuments from Rio Viejo and their Historical Implications*

The analysis of a dozen recently documented inscribed monuments from the ancient urban center of Rio Viejo, in the Pacific littoral of Oaxaca, provides new insights regarding the historical and political development of the regional capital in the lower drainage of the Rio Verde.

Uriarte Torres, Alejandro (Instituto Nacional de Antropología e Historia)

[215] *Consumo de bienes de prestigio y estrategias políticas: Una propuesta diacrónica para el noroeste de Yucatán en el Preclásico*

Durante el Preclásico, el noroeste de Yucatán atestiguó el desarrollo de grupos sociales complejos tempranos evidenciados por la aparición de una jerarquía de asentamientos y una arquitectura de función cívico-ritual. La evidencia arqueológica indica que estos grupos tenían acceso a bienes de intercambio a larga distancia de productos elaborados con diversas materias primas: obsidiana, jade y basalto, por mencionar los que aparecen con mayor frecuencia en contextos arqueológicos. En contraste, existe poca evidencia de la relación entre el consumo de estos bienes y grupos que puedan ser considerados de élite. En este trabajo se explora la relación entre el estatus social expresado en la calidad e inversión de fuerza de trabajo en construcciones residenciales y la distribución de bienes de prestigio, con base de los datos recuperados durante las excavaciones efectuadas en los sitios de Caucel, Anicabil, Xaman Susula y Xanila (localizados en la periferia occidental de la ciudad de Mérida, Yucatán). Los resultados obtenidos permiten analizar la relación entre la codificación social de los bienes, acceso a ellos y estrategias políticas económicas, de acuerdo a la teoría acción colectiva, efectuando una propuesta diacrónica desde el Preclásico Medio (1000–450 aC) hasta el inicio del Clásico Temprano (ca. 250 dC).

Uriarte Torres, Alejandro [337] see Flores Esquivel, Fernando C. Atasta

Uribe, Mauricio

[202] *Repensando la verticalidad en tiempos del Inca: El caso de Zapahuira, Sierra de Arica, Norte de Chile*

A mediados de 1970 surgió la conocida discusión si el dominio incaico en el norte de Chile había sido directo o indirecto, a partir de la aplicación que se hizo del modelo sobre la "verticalidad" andina de John Murra. De acuerdo con esta propuesta, la situación se dirimía en términos de que cuán abundante era la materialidad del Inca en los territorios conquistados, especialmente arquitectónica y cerámica, y cuánto ésta se atenía al estilo original del Cusco. De acuerdo con las incipientes investigaciones de aquella época, predominó y mantiene cierta vigencia la hipótesis de la ausencia de una conquista propiamente tal y que más bien se trató de un dominio indirecto sobre la base del sistema ecológico previamente implantado por grupos altiplánicos en tierras bajas. Aprovechamos este simposio para discutir estos planteamientos a través una síntesis y actualización de nuestros estudios en los sitios Tambo y Collcas de Zapahuira, aportando con nuevos datos tecnológicos, estilísticos, funcionales y cronológicos sobre la expansión del Tawantinsuyo en las tierras altas de Arica.

[134] *Chair*

Uribe, Mauricio [134] see Santana Sagredo, Francisca

Urquhart, Lela

[166] *Measuring the Impact of Ancient Colonization in Central-West Sicily*

Studies of ancient colonization in the Mediterranean have principally been concerned with assessing the "impact" of colonization: did the colonization processes of groups like the Greeks and Phoenicians make a significant impact on local native societies among whom they settled, and if so, in what ways? Important as such questions are, they have sometimes overlooked a more basic step: how do we actually measure the "impact of colonization" in the first place? This paper offers a response to that question through the case study of ancient central-western Sicily. It argues that a good way to examine colonial-indigenous interaction is to isolate an aspect of culture that can be a) observed cross-culturally and temporally; b) measured using material correlates; and c) has interpretive salience. For ancient Sicily, religion best fits those criteria. Applying religious correlates to the archaeological record of Sicily between 900–400 BCE reveals important changes. First, colonization catalyzed shifts in the structure and scale of indigenous religion. Second, in terms of "impact," Greek colonization influenced local religious expression more than Phoenician colonization, particularly after 550 BCE. Third, the perception of this "impact," however, was due to religious modifications made by all groups—indigenous and colonial—to fit changing sociopolitical circumstances.

Usai, Donatella [219] see Jakob, Tina

Uzawa, Kazuhiro (University of East Asia), Mai Takigami (Yamagata University) and Yuji Seki (National Museum of Ethnology)

[238] *Beginning of Camelid Breeding during the Formative Period at the Pacopampa Site, Peru*

Our research on faunal remains from the Pacopampa and the Kuntur wasi sites has shown that Camelid breeding began during the Late Formative period (800–500 BC) in the northern highlands of Peru. However, motives for the introduction and usage of these animals remain obscure. We conducted multidisciplinary analyses of the camelid remains from the Pacopampa site to investigate breeding and utilization patterns of these animals. The Sr and O isotope values from tooth enamel showed that 17 of 18 camelids from the Late Formative period had been bred and kept for their lifetimes.

near the sites. Although corresponding data for the Middle Formative period (1200–800 BC) is not available currently, N and C isotope ratios were statistically different from those of the Late Formative period. It suggests Camelids were bred in different areas and then transported to the site during the Middle Formative period. Mortality profiles and pathological observations indicate that camelids had rarely been used as pack animals but were consumed as meat during ritual feasting, used as sacrifice and possibly utilized for their hair. We conclude that camelid dispersal was undertaken in connection with the development of a complex society in the region.

Vacca, Kirsten (University of California, Berkeley)

[19] *The Construction of Archaeological Practice: Sex/Gender and Sexuality on the Fringe*

Archaeologists have incorporated sex/gender and sexuality research in projects for decades, yet such foci have failed to become widespread as they are largely considered a specialty or niche topic. This paper first looks at why the topics in question have remained on the fringe of archaeological research. The subsequent discussion analyzes ways in which contemporary practices can counteract deeply embedded ideas about the archaeology of sex/gender and sexuality, making this approach to the record more accessible to a larger audience. The importance of examining the social constructs in daily life is brought into focus through a discussion of Hawaiian house complexes (kauhale). An analysis of the use of space in Hawaiian kauhale uses the integration of interpretive methods to answer the following questions: How do contemporary theories and methodologies address gender and sexuality archaeologically? How can we best implement interdisciplinary work in answering questions about sex/gender and sexuality constructs? How can we better communicate the legitimacy and importance of this type of research to our colleagues and the general public? The resulting discussion aims to move sex/gender and sexuality research from a niche to mainstream topic that is considered integral to any analysis of social life in the past.

[19] *Chair*

Vadala, Jeffrey (University of Florida) and Jennifer Chmilar (University of Calgary)

[44] *Seasonal Rhythms and Quotidian Duties: Insights into the Impact of Environment on Structuring Daily Life Using El Eden Wetland, Quintana Roo, Mexico, as a Case Study*

All cultural groups must respond to and adapt within their surrounding environment, as was the case for the ancient Maya. The Maya area consists of various distinct ecological zones, from volcanic highlands through swampy bajos and across a dry karstic plain punctuated by wetlands, each providing distinct adaptation opportunities. Seasonal fluctuations provide further texture to the flow of each landscape. This paper explores and attempts to characterize the temporality of the ancient Maya wetland landscape of El Eden, Quintana Roo, Mexico. By temporality, we mean the unique temporal rhythms of the landscape and also social life that organized and guided the interconnected tasks vital to ancient Maya life. To do this, we use a historical ecological approach supplemented by topographic data, 3D simulations, and seasonal photographic data. Our theoretically driven approach allows us to reconstruct and characterize the unique seasonal rhythms found at El Eden and the corresponding tasks that uniquely developed in response to the seasonally fluctuating wetland landscape. By focusing on seasonality, temporality, and tasks, we demonstrate that life at ancient wetlands were organized in a unique manner contrasting but also complementing other modes of ecological adaptation seen in the Maya area.

Vågene, Åshild J. [143] see Bos, Kirsten

Vail, Gabrielle (UNC-Chapel Hill)

[60] *Mesoamerican Spindle Whorls from a Technological and Ideological Perspective*

An important aspect of textile production involves the preparation of fibers, an activity that is represented in the archaeological record from Mesoamerica primarily through the presence of spindle whorls made from a variety of materials, most commonly pottery, but also stone, wood, shell, and gourds. Although occasionally recovered from primary contexts, spindle whorls are more often found in secondary depositions such as burials and caches, or in middens. This paper focuses on spindle whorls from two interrelated perspectives—i.e., the technological aspects that were of importance to the production of different types and grades of cloth, and the ideological aspects suggested by the presence of elaborate incised motifs on mold-made spindle whorls from the northern Maya lowlands, depicting birds, flowers, and other quadripartite motifs, as well as their connection to a series of female deities who have associations with childbirth, fertility, and the life cycle. Our analysis seeks to address both aspects of these important tools and to examine the interplay between them within the context of weaving as a symbolic—as well as a functional—domain.

[60] *Chair*

Valcarce, Ramon

[23] *Chair*

Valcárcel Rojas, Roberto (Faculty of Archaeology, Leiden University) and Menno Hoogland (Faculty of Archaeology, Leiden University)

[395] *European Material Culture in Indigenous Sites in Northeastern Cuba*

Northeastern Cuba, particularly the modern-day province of Holguín, is one of the areas of the Caribbean with the largest number of indigenous sites yielding European objects. In the sixteenth century, most of these sites maintained direct or indirect links with Europeans, while others were transformed into permanent colonial spaces by the Spaniards. The study of European objects found at these sites suggests that some of these items were acquired through exchange or as gifts. However, the largest collections of objects appear to have originally functioned as tools or other items used by both Europeans and Indians for mining and agricultural labor. We believe this pattern was established as a result of a process of conquest and colonization specific to Cuba, during which European colonizers rapidly managed to control the local population, thus limiting the indigenous capacity for negotiation.

Valde-Nowak, Pawel [389] see Ciesla, Magda

Valdes, Alejandro (INAH Michoacán), Lissandra Gonzalez (INAH Michoacán), Mijaely Castañón (INAH Michoacán) and José Luis Punzo (INAH Michoacán)

[12] *Marine Shells and Green Stones as Funerary Objects from Tomb II, Tingambato, Michoacán*

A través de la historia, los rituales y formas de enterrar a los muertos han variado entre grupos culturales y regiones. Mesoamérica y particularmente su área occidente no fueron la excepción. En este territorio se han descubierto tumbas acompañadas de ofrendas desde épocas correspondientes al periodo Formativo y que, con el paso del tiempo, constituyeron verdaderas tradiciones funerarias. La zona arqueológica de Tingambato se encuentra en el límite sur del poblado que lleva el mismo nombre en el estado de Michoacán. Su topónimo puede derivar de "Tinganio" que en lengua tarasca significa "lugar donde termina el fuego," haciendo referencia a las condiciones geográficas del lugar: donde comienza la Tierra Fría y termina la Tierra Caliente. Fue en este importante sitio donde, en el año de 2011, se descubrió una segunda tumba que contenía los restos de un importante personaje, acompañado de un ajuar funerario compuesto por casi 20,000 elementos elaborados en conchas marinas y piedras verdes.

Valdes, Alejandro [12] see Gonzalez, Lissandra

Valdez, Fred (University of Texas at Austin)

[83] *Origins: Contextualizing the Beginning and Development of the PfBAP*

The introduction of a large-scale regional project in northwest Belize began as a more modest endeavor in northeast Guatemala. How the Programme for Belize Archaeological Project (PfBAP) began, how it has modified through several decades, and what we anticipate as its future are discussed. A brief review of select projects within the PfBAP are mentioned as examples of overall program interests. Importantly, the PfBAP relationships with the Belize Government, local communities, and other entities are also presented.

[83] *Chair*

Valdez, Fred [83] see Luzzadder-Beach, Sheryl

Valdez, Kate

[295] *Discussant*

Valentin, Norma (Instituto Nacional de Antropología e Historia), Gilberto Pérez Roldán (Universidad Autónoma de San Luis Potosí), Erika Lucero Robles Cortés (Proyecto Templo Mayor) and Israel Elizalde Mendez (Proyecto Templo Mayor)

[225] *Technological Analysis of Bone Bloodletting Instruments from the Offerings of the Great Temple of Tenochtitlan*

In the seventh season of excavation at the Templo Mayor Project (2007–2014), 25 bone awls were recovered from offerings found in front of the staircase of the Great Temple of Tenochtitlan. We were able to determine that the bone awls were elaborated from bones of birds and mammals, such as eagle (*Aquila chrysaetos*), jaguar (*Panthera onca*), mountain lion (*Puma concolor*), wolf (*Canis lupus*), and whitetail deer (*Odocoileus virginianus*). The bone awls were recovered from five offerings (120, 121, 126, 141 and 149), of which three were located in places directly associated with goddess Tlaltecuhltli and the other two in the Cuauhxicalco. All of them correspond to the sixth construction stage (AD 1486–1502). In the present study we performed a taxonomic identification, typological analysis and manufacturing technique analysis of the recovered bone tools with the purpose of increasing our knowledge of the complex bone industry that the Tenochca Empire had during the government of Ahuizotl.

Valentin, Norma [94] see Velazquez, Adrian

Valentinsson, Signe (Hunter College)

[304] *Early Pottery at Petrified Forest National Park*

Petrified Forest National Park is notable for the diversity of its ceramic assemblages which encompass several major ware groups. The earliest ceramics sequence saw one of the most dramatic shift in pottery production techniques at any time in the park, from the paddle and anvil, micaceous tempered Adamana Brown Ware, to the coil and scrape, sherds and sand tempered white wares and gray wares that dominate the rest of the park's ceramics assemblages. This poster presents a characterization study of 84 sherds from three major ware types that span the adoption of pottery during Basketmaker II to the emergence of white and gray wares in Pueblo I (AD 600–800). By describing the distinctions in methods and materials of construction among these early wares, it attempts to improve understandings of the beginning of ceramic production and the Basketmaker-Pueblo transition in the park.

Valenzuela, Daniela (Departamento de Antropología, Universidad Alberto Hurtado), Bárbara Cases (Departamento de Antropología, Universidad de Tarap), Persis B. Clarkson (Department of Anthropology, University of Winnipeg), José M. Capriles (Department of Anthropology, Pennsylvania State Uni) and Victoria Castro (Departamento de Antropología, Universidad Alberto)

[134] *Where Are the Camelids? Mobility Models and Caravanning during the Late Intermediate Period (ca. AD 1000–1400) in Northernmost Chile, South Central Andes*

Llamas were one of the most valued animals in the Andes. Their importance has transcended the subsistence sphere as they were not only used as a source of food but also served for medicinal and ritual purposes; their fiber was fundamental for manufacturing textiles, and they were a source of symbolism and “food” for thought and ideologies. Nevertheless, their use as pack animals in exchange caravans has been prominent, stimulating intense mobility and long distance traffic between diverse ecological regions as well as mediating political alliances and social interaction. In this paper we analyze the archaeological evidence of caravan movements available in the lowlands (coast and valleys) of northern Chile and discuss the role played by local populations in the systems of interregional traffic. Until recently, it has been assumed that lowland populations relied on a mixed agro-maritime economy and that caravan transport was a specialization carried out by pastoralists of the Andean highlands. We discuss alternative models of mobility (with and without caravans) for explaining the regional flow of goods and social interaction by emphasizing the diversity of participation strategies that lowland populations exercised.

Valenzuela, Daniela [134] see Gayo, Eugenia M.

Valenzuela-Lamas, Silvia and Ariadna Nieto-Espinet (University of Lleida/CNRS—UMR 5140)

[275] *Ding Dung: Animal Enclosures, Digested Bones, and Where was the Livestock in the Archaeological Site? Evidences from Experimentation and Zooarchaeology from Late Prehistory in the Western Mediterranean*

One of the most intriguing questions in many archaeological sites is to elucidate where the livestock was kept, and which and how many animals were herded. This is particularly compelling in Late Prehistory, when many sites were heavily fortified, and all the space intramuros seemed to be occupied by domestic buildings. Some disciplines, such as micromorphology and palynology, help to answer some of these questions. In this paper, we will provide a perspective from zooarchaeology, which is one of the least explored disciplines to detect where the living animals were. Together with a review of the archaeological and zooarchaeological literature for Late Prehistory in the Western Mediterranean, we will provide the results of a present-day experiment with pig dung. The objective of this experiment is to analyze whether the accumulation of digested bones could testify of the presence of pig enclosures, a hypothesis raised for the Iron Age levels of Althiburos (Tunisia; Portillo et al 2012).

Valese, Immacolata (University of Bologna) and Davide Domenici (University of Bologna)**[283]** *The Changing Use of Space in Cahokia's Urban Epicenter: Archaeological Investigations on the Merrell Tract (2011–2016)*

The paper summarizes the results of six field seasons since 2011 by a joint Italian/American archaeological project on the Merrell Tract 300 m west of Monks Mound. The extensive excavations, expanding upon the area of Wittry's 1960 salvage work on Tract 15B, revealed a complex sequence of occupations covering the entire sequence of Cahokia's history spanning the Edelhardt through Sand Prairie phases. Throughout its history the Merrell Tract experienced important changes: first as a domestic area occupied by Emergent Mississippian residential groups; then, during the Cahokian apogee (Lohmann and Stirling phases), it was marked by a sequence of large wooden buildings as part of its transformation into a public space, the West Plaza; finally, it reverted back to a domestic area during the Moorehead and Sand Prairie phases, just before the city's abandonment. The recovered data clarify many aspects of this long occupation, especially those related with the shape of a rather enigmatic Stirling-phase bastioned compound and with the unexpectedly complex Moorehead-phase occupation of the area.

Vallejo-Cáliz, Daniel [329] see Kidder, Barry

Van Alstyne, Benjamin (UNLV)**[368]** *3D Modeling the Sites of the Virgin Branch Ancestral Puebloan with Photogrammetry and BIM*

On the Shivwits Plateau, there is scarce information concerning how the Virgin Branch Ancestral Puebloan people constructed their pueblos. This is a result of postdepositional processes that have destroyed much of the building materials. To overcome this hurdle, 3D Building Information Modeling (BIM) is allowing archaeologists to reconstruct these ancient structures digitally. These digital 3D models output volumetric data that are used to estimate material quantities, labor investments, and to evaluate whether the structures were occupied seasonally or year-round. However, these 3D models can be further enhanced through the method of Photogrammetry, which archaeologists are using to record ancient sites digitally. This method is through stitching photos together and producing a 3D model of the ancient sites. Additionally, Photogrammetry results in a more accurate record than a hand sketched map and is significantly less expensive than lidar. Through the combination of Photogrammetry and BIM, this research is creating a more accurate reconstruction of the ancient pueblo sites.

van Boekel, Dieuwertje [326] see Rice, Shaelyn

Van Buren, Mary (Colorado State University)**[164]** *The Environmental Effects of Indigenous Smelting in the Southern Andes: A Look at the Source*

Air pollution caused by preindustrial metal production in the Andes has been reported by scholars using data collected from lake sediments and ice cores. An important source of this pollution, which consists primarily of lead dust, is Potosí, Bolivia, a mining center that produced large quantities of silver during the early colonial period and, perhaps, during prehispanic times as well. This paper examines the environmental effects of indigenous silver production by investigating the operation of huayrachinas, small furnaces that were used to smelt argentiferous ores in Potosí and the surrounding area. Two aspects of production are assessed using data collected during the observation of an individual who continued to use this technology into the twenty-first century: the quantity of charcoal employed in the smelt and the amount of lead that was incorporated into the charge. These variables relate directly to the effects of mineral production on the environment, namely deforestation and lead contamination of the air, water, and soil.

Van Damme, Trevor (UCLA)**[240]** *Transport Stirrup Jars in Context: Post-Palatial Politics and Social Resilience in Late Bronze Age Greece*

Entanglement theory highlights the dynamic relationship between actors and the objects they create. Recent application of entanglement theory within the framework of post-collapse societies holds much promise for highlighting the role of human actors as agents of resilience. Following the collapse of the palace system in Late Bronze Age Greece (c. 1200 BCE), there were shifts in the overall settlement pattern as a result of increased mobility and innovative technologies (e.g., iron). Within these post-palatial communities, the household offers a stable framework for understanding actor-object relationships within a contextualized setting. In this paper I discuss the actor-object dialectic with reference to a single vessel type, the transport stirrup jar (TSJ). TSJs were the primary vessel for moving bulk liquid commodities in the Aegean during the palatial period. Their production seems to have been closely tied to palatial interests in managing the production of wine and oil. By examining the find contexts of post-palatial TSJs, as well as discussing developments in form, I demonstrate that a shape previously associated with transport had been completely transformed into a functionally useless, but socially potent showpiece. These observations nuance previous understandings of the eventual disappearance of TSJs from the Mycenaean repertoire.

Van Den Hurk, Youri (University College London)**[378]** *Cetacean Exploitation in the Medieval London*

Zooarchaeology aims to reconstruct the relationship between humans and animals based on the bone remains of these animals. However the field is often primarily concerned with (domesticated) terrestrial mammals, frequently neglecting cetaceans. This can be ascribed to the fact that zooarchaeological cetacean remains are often too fragmented for identification and a general lack of extensive cetacean reference collections for comparison, resulting in poor understanding of early human-cetacean relations. Numerous medieval sources mention the exploitation of cetaceans in the United Kingdom, including London. These sources often mention that the exploitation and consumption of cetaceans were restricted to the social elite. London was already a large city in the medieval period and at numerous archaeological sites have cetacean remains been uncovered. These remains are often fragmented and have been neglected and understudied so far. By examining these remains and performing ZooMS (Zooarchaeology by Mass Spectrometry) an attempt will be made to see which species were exploited and whether their consumption was indeed restricted to the social elite, as stated by the medieval sources.

van der Haas, Victoria M. (University of Alberta), Vladimir Ivanovich Bazaliiskii (Irkutsk State University) and Andrzej Weber (University of Alberta/Aix-Marseille University)**[330]** *Micro-Sampling Dentine to Reconstruct Life Histories of Holocene Hunter-Gatherers in Siberia*

This paper presents a contemporary method for investigating the dietary history of past peoples using micro-sampling dentine of molars from middle Holocene (~8300–3500 cal BP) hunter-gatherers in the Cis-Baikal region, Siberia. The dentine has been sampled into 1 mm strips and each is analyzed for carbon and nitrogen stable isotope ratios. Each dentine strip represents roughly nine months of developmental life while bones samples typically average over the course of ~10–20 years. Previous geochemical tests demonstrated that during the Early Bronze Age a number of individuals migrated from the north of the Cis-Baikal, the Upper Lena area, toward the coast of Lake Baikal, the Little Sea micro-region. Some hunter-gatherers appear to have retained diets typical of their homeland while in other cases they were abandoned for new local diets. Micro-sampling of dentine allows for a more

complete and informative record of human behavior in the Baikal region and a greatly improved temporal resolution of the chemical signatures obtained from human teeth.

Van der Pluijm, Gabriel

[252] *True Potential: A Database on Osteological Material in Nicaragua*

Archaeological research in Nicaragua has yielded an abundance of human osteological material. Excavations at sites like Monkey point on the Caribbean coast and RURD-UNAN in Managua have uncovered impressive and extensive human inhumations. These sites are among the only four sites in Nicaragua where an extensive osteological study has been done and published. Yet many more unpublished literature mentions or has documented osteological remains. What is the real extent of the uncovered osteological material in Nicaragua? What potential lies in the study of this untouched material? This study presents a database compiled of published and unpublished literature that mentioned or studied osteological human remains. The database shows in detail what osteological material is found, if any research has been done on the material and if so what methods were used. Analyzing this database shows that there is indeed an abundance of material that has yet to be studied. Furthermore it shows that there is great need and potential for expanding the science of human osteology in Nicaragua.

van Dijk, Kaz [179] see Donner, Natalia

Van Dommelen, Peter (Brown University)

[166] *Discussant*

Van Dyke, Ruth (Binghamton University)

[20] *Chaco Canyon: Dispersed Settlement, Dialectical Tension, and the Rise of an Ancient Polity in the Southwest United States*

Two dozen monumental buildings lie at the heart of Chaco Canyon, a UNESCO World Heritage site in the southwest United States. However, ancient Chaco Canyon was not a single locality but a focal point for outlier settlements spanning a region of 60,000 square miles. The canyon-outlier relationship is key to understanding the Chacoan polity. Residents of canyon and outlier settlements within a dialectical relationship gathered periodically to share resources, marriage partners, and ritual knowledge. When contradictions within this relationship reached a tipping point, a group of small-scale, dispersed farmers transformed into a centralized, hierarchical rituality where secret ceremonial knowledge legitimated elite political authority.

[157] *Discussant*

Van Dyke, Ruth [373] see Turner, Michelle

Van Gelder, Leslie (Walden University)

[172] *Who Holds Your Light? Revealing Relationships through a Forensic Approach to Upper Paleolithic cave Art*

The study of finger flutings, lines drawn with fingers in the soft surfaces of cave walls and ceilings, allows for the identification of unique individuals within a cave's context. In early years of research we were able to identify men, women, and children in some of the 15 caves which have been studied. These led to discoveries as to which individuals which were often found together in their movement through the caves. The intimacy of cave spaces with artists working side by side, sometimes in very small spaces, and in a variety of combinations of children and adults, males and females, allows us to begin to imagine the embodied experiences and relationships of these people. Through looking at the cave artists with a forensic approach and a relational lens we begin to shine a light on themes of intimacy, cooperation, community and play in the Upper Paleolithic. Finally, this paper considers how our discipline might be radically changed were it to focus research agendas on questions of looking for evidence of intimacy, relationships, and the invisible but powerful impact of the generosity of the human heart in something as simple as holding another's light in a darkened cave.

van Gijn, Annelou (Leiden University) and Matilda Sebire (Leiden University)

[379] *Making Amber Beads: Technological Insights into a Late Neolithic and Bronze Age Craft Activity*

Experimental research of different ways of shaping and perforating amber beads has provided insight into the signatures of different manufacturing techniques and the character of the tools involved. Using stereo and incident light microscopy it was for example possible to distinguish the features from the use of metal tools from the traces resulting from flint implements. Perforating amber with drills made of different raw materials like wood, metal, flint and antler, also show considerable variation in traces, with Micro CT scans further elucidating the exact shape of the perforation and allowing a close scrutiny of the production marks. This knowledge was used to study beads from Late Neolithic and Bronze Age settlements and burials, located in the present-day Netherlands. Late Neolithic coastal settlement sites have shown evidence for large scale production of amber beads, with beads being markedly different technologically from contemporary funerary sites further inland. This observation will be examined from the perspective of craft specialization and identities of the makers and users of these beads. In this paper we will discuss our experimental results and use these findings to better understand the archaeological observations on beads from Late Neolithic and Bronze Age settlement and funerary sites.

van Gijn, Annelou [379] see Guzzo Falci, Catarina

Van Gijseghem, Hendrik (Université de Montréal)

[147] *Discussant*

Van Hagen, Logan (Department of Anthropology, University of Georgia), Kathryn L. Ranhorn (Center for the Advanced Study of Human Paleobiology), Tamara Dogandžić (Department of Human Evolution, Max Planck Institut) and David R. Braun (Center for the Advanced Study of Human Paleobiology)

[153] *Lithic Analysis of GaJj17: A Middle Stone Age Locality in Koobi Fora, Northern Kenya*

The Koobi Fora region in eastern Turkana, northern Kenya, is known for its preservation of Plio-Pleistocene hominin fossils. However, very little is known about the Middle Stone Age (MSA) from this region. Fossil and genetic evidence suggest modern humans originated in eastern Africa ~200ka, adding to the significance of this time period and region. In 2016, we excavated site GaJj17, an MSA site located in Area 104 of Koobi Fora. Here we present lithic analysis of recovered in situ and surface artifacts, building on the work of Alison Kelly (1996). These data points were used to understand the overall lithic technology and how they were affected by taphonomic forces. This research showed differences in raw material composition across the site: igneous rocks are more common in situ, and cryptocrystalline silicates (CCS) were more abundant on the surface. This may represent a disparity in

collection method, with differential weathering of surface volcanics leading to over-collection of CCS. Reduction intensity analyses indicate that both were produced in the early stage of reduction. Finally, we document the presence of in situ Levallois technology.

Van Horn, Mark (Pennsylvania State University), Adi Eliyahu (University of Haifa), Naama Yahalom-Mack (Hebrew University of Jerusalem) and Anne E. Killebrew (Pennsylvania State University)

[193] *Reconstructing Phoenician Iron Production at Tel Akko, Israel*

Recent excavations (2010–2016) at the Mediterranean port city of Tel Akko, directed by A.E. Killebrew and M. Artzy, have uncovered abnormally large quantities of iron slag and remnants of iron working spanning the sixth–fourth centuries BCE. This mid-first millennium smithy, which smelted iron on an industrial scale, is the only known iron working facility in the Levant dating to the Persian period, providing an unparalleled opportunity to explore iron production at a Phoenician maritime center. This poster presents the preliminary results of iron ore provenience studies utilizing osmium isotope analysis of iron slags and spatial distribution of slags at Tel Akko using geographic information systems (GIS) to address questions relating to sources of the ore, the reconstruction of the Phoenician iron industry at Tel Akko, and its larger economic role in the Achaemenid Empire.

van Roggen (Paterson), Judith (University of British Columbia Okanagan)

[104] *A Case for Clan: Revisiting Sand Canyon Pueblo*

Archaeobotanical reanalysis of plant remains from the late Pueblo III Mesa Verde site of Sand Canyon Pueblo has yielded pharmacological plants and presence of clans. In this presentation the social organization of the site is explored through mythic and historic relationships recorded in Emergence narratives and ethnography. Plants, art, artifacts, architecture, and disease at Sand Canyon Pueblo provide compelling evidence of Bear clan shamans, who, through their association with the mythic Elder and Younger Warrior Brother Twins are gifted the ability to diagnose disease. This process is encoded in rock art in the region and documented ethnographically. As the ceremonial father of the Younger Warrior Brother, the Bear clan is a significant source of social, religious, and leadership power that continues to assert influence today. A human skeletal anomaly and bear effigy at Sand Canyon Pueblo is echoed in similar evidence at Pueblo Bonito in Chaco Canyon suggesting considerable time depth to these connections. Sand Canyon Pueblo as “first” evidence for archaeological clans in the northern Southwest also hints at contributing factors in Mesa Verde depopulation and the more visible iconography of the Pueblo IV period.

Van Voorhis, Laura (University of Florida), Valentina Martinez (Florida Atlantic University), Nicole Jastremski (Central Washington University) and John Krigbaum (University of Florida)

[232] *Isotopes of Coastal Ecuador*

A preliminary report is presented on research into the diet, health, and mobility patterns for prehistoric coastal Ecuador, based on an analysis of both modern data and archaeological data from Site 035 Salango. An assessment of dietary habits provides insight into a broad range of societal developments, such as the implementation and timing of maize agriculture. Additional insights are provided by an osteological evaluation of human remains, with a particular focus on evidence of pathologies associated with diet. Establishing whether the individuals were born locally, as well as the geographic place of origin for non-native individuals, yields insight into social and economic aspects from the past. Starting with an isotopic baseline for the coastal region of Ecuador, derived from contemporary water, soil, flora, and fauna samples, together with selected archaeological samples, we can compare the isotopic content of human remains to draw conclusions about the deceased's diet and residences. Preliminary results are presented based on archaeological samples of four individuals and contemporaneous fauna derived from three distinct tomb burials from the Manteno culture. Individual teeth and bone samples from the same individual are utilized to construct a comprehensive life history to provide insights into patterns of diet and migration.

Van Wandelen, Paul (New Mexico State University)

[107] *Weapons of a Spanish Colonial Road: An Analysis of Arms Found at Paraje San Diego, New Mexico*

The Camino Real de Tierra Adentro served as the main conduit of transportation in New Mexico from 1598 until the 1880s, with continued regional use afterward. Situated in strategic locations along this road were stopping points, called *parajes*, which travelers used to rest. *Parajes* are usually described as campsites in literature and less attention is given to the other activities that occurred at these sites. In recent reanalysis of collections from Paraje San Diego, a historical *paraje* near Las Cruces, New Mexico, a significant number of arms and ammunition have been found ranging from lithics to modern firearms. The notable presence of such materials indicates some of the activities which occurred at these sites. As stopping points along lengthy, well-used roads, these sites were home to food gathering, violence, and target practice, among other uses. This paper will present an analysis of the arms found at Paraje San Diego and discuss when, how, and possibly why they were used by travelers using the *paraje*. Understanding the wide variety of roles these arms served to travelers on the Camino Real will lead to a better understanding of both *paraje* sites and their uses, as well as travel along the road.

van Wessel, Jürgen (Headland Archaeology [UK] Ltd)

[294] *Osteo-Grammetry: Using Photographs to Rapidly Model Large Cemeteries in Three Dimensions*

Recent excavations at the nineteenth-century St Peter's Burial Ground, Blackburn (UK) are the first to demonstrate the immense value of photogrammetry for recording human remains on a large scale. Photogrammetry is the process of using photographs to record objects in a measurable way. Recent developments have made the technique accessible and capable of high levels of detail in both geometry and texture. These attributes make photogrammetry very appealing to archaeologists and it should now be considered part of the standard recording toolbox. This paper presents the initial results of the individual photogrammetric recording of 2,000 burials. Both on-site and post-excavation processes will be discussed, demonstrating why it was by far the most appropriate technique for this type of project. The outputs have enabled a comprehensive re-stratification of the site, visualization of the density and depth of burial plots in 3D, and the spatial plotting of a wide range of osteological, artifactual and demographic datasets. The technique has clear applications on North American sites, where rapid, high-quality recording of human remains and other archaeological material is crucial. This is especially true for rescue archaeology in areas affected by high erosion or development pressure.

Vandam, Ralf (University of Leuven—SUNY Buffalo), Peter F. Biehl (SUNY Buffalo), Patrick T. Willet (SUNY Buffalo) and Jeroen Poblome (University of Leuven)

[371] *Past Communities in the Marginal Landscapes of the Western Taurus Mountains, Southwest Turkey: The First Results of the Dereköy Archaeological Survey Project*

This paper presents the results of a new survey project in the Border Region (southwest Turkey). Previous archaeological research in southwest Turkey has until now mainly focused on the larger fertile lowland areas, which revealed numerous farming settlements from the Neolithic onward and illustrated clear distinctive periods of continuity and collapse in human occupation in these areas. The more marginal areas in the landscape such as remote, high altitude locations, on the other hand, have not been the main area of interest. The new Dereköy Archaeological Survey Project, conducted within the framework of the Sagalassos Project, aims to fill this gap in knowledge by shedding light on how different landscape units were incorporated into the

cultural landscape. By investigating the Dereköy highlands we would like to examine how and when past communities used more marginal landscapes, and to provide a window on periods which are currently poorly known in plain areas, such as large parts of the Chalcolithic (5500–3500 BC), the Late Bronze Age (1600–1200 BC), and the so-called Byzantine Dark Age (eighth–tenth centuries AD). The unique archaeological datasets of both low and highlands allow us to paint a more comprehensive picture of the prehistoric cultural landscape in Anatolia.

VanderHoek, Richard
[148] *Discussant*

VanDerwarker, Amber (UCSB)

[174] *Analytical Approaches for Identifying Ritual Contexts*

Paleoethnobotanists continue to push plants into the realm of social archaeology, particularly in terms of examining how plants articulated with ancient ritual practices. The examination of the connection between plants and ritual, however, is not a straightforward process—researchers must first appropriately identify special contexts and/or foods, after which they must attribute meaning to the contexts and events they have identified. This presentation focuses on the first step—identification of ritual plant deposits, using the plant assemblage as the means of definition. I discuss several analytical approaches and quantitative methods for achieving this goal while also highlighting relevant case studies.

Vang, Natasha P. [231] see MacDonald, Taylor

VanPool, Christine [155] see Willhite, Brenton

VanPool, Todd (University of Missouri) and Christine VanPool (University of Missouri)

[157] *Traveling to the Horned Serpent's Home: Pilgrimages to Paquimé*

In the thirteenth and fourteenth centuries, a new political and religious capital expanded its influence in the North American Southwest. This settlement, called Paquimé or Casas Grandes, was the focus of pilgrimages that reflected and reinforced the social dominance of the elites living at the community. However, caches of millions of ocean shell, instances of human sacrifice, and other aspects of the archaeological record indicate that Paquimé itself was likely considered a living entity that helped control access to water throughout the region. The pilgrimages consequently reflected and created a reciprocal relationship in which the settlement legitimized the elites living there while the elites reinforced and emphasized the sentient nature of the settlement. The resulting pattern is largely consistent with Southwestern and Mesoamerican perceptions of animated places where human and nonhuman beings negotiated complex relationships within the larger cosmological network. These animated locations were often the focus of pilgrimages, and included living communities, ancestral communities, natural features (e.g., the Zuni pilgrimages to the Salt Lake), and symbolic representations of the heavens.

VanTries, Eden (Indiana University of Pennsylvania)

[89] *An Assessment of Prehistory at Historic Hanna's Town*

Historic Hanna's Town, a colonial settlement in western Pennsylvania, was founded in 1769 and quickly made history by becoming the first county seat west of the Allegheny Mountains in 1773. In 1775, Hanna's Town made history again by signing the Hanna's Town Resolves, stating that they would take action if British tyranny continued. Hanna's Town soon became embroiled in the Revolutionary War and as a result was attacked and set on fire by the British and Seneca. Hanna's Town did not recover from this attack and was dissolved as the county seat. The site was then farmed until 1969 when Westmoreland Historical Society purchased the land and placed it on the National Register of Historic Places. Since, the site has been excavated resulting in the recovery of artifacts from colonial as well as prehistoric periods. Most of the research on the site focused on the colonial period resulting in little information about the prehistoric use of the site. This research project examined the occupation of the site prior to Hanna's Town, by classifying the bifaces recovered from the site by type and raw material to determine the time of occupation and where the material was procured.

VanValkenburgh, Parker (Brown University)

[118] *Site-Seeing: Aeriality, Archaeological Survey, and Objectivity in Coastal Peru*

Far from being *mana* from the future, aerial imagery has been integral to both the practical and conceptual dimensions of archaeological survey almost from its inception. In this presentation, I argue that aerial photography captured via private and state-funded reconnaissance in the 1930s and 1940s played a transformational role in the emergence of regional approaches in Peru's desert coast in the mid-twentieth century. I discuss how the use of aerial imagery has both enabled and constrained the interpretation of archaeological phenomena and participated in the construction of the objects of archaeological survey—sites, artifacts, and landscapes. I then consider how more recently available products—high resolution, multi-spectral satellite imagery, UAV photography and near-surface remote sensing—participate in the same processes.

[64] *Discussant*

VanValkenburgh, Parker [230] see Cronin, Joseph

Vara, Rachel (University of Texas at San Antonio) and Whitney Lytle (University of Texas at San Antonio)

[43] *How I Spent My Summer Vacation: A Model for Archaeology Camps in Service of Public Outreach*

Public outreach and education has increasingly become an essential component of archaeology. Helping the community become invested in the past can do wonders for perpetuating the archaeological ideals of cultural preservation and conservation. Instilling these values in the younger generation is one of the most effective ways to create a more culturally conscious future. The University of Texas at San Antonio's Center for Archaeological Research aims to meet this goal through their educational outreach program titled "Legacy: Hands on the Past." The Legacy program offers many archaeology based learning opportunities for local students, teachers, and other community members throughout the year. Within this presentation we will highlight one of the longest running methods to connect the past to the present employed by the Legacy program. After years of fine tuning, the Legacy team has developed a highly successful model to create an annual archaeology themed summer camp that couple learning and fun for a holistic experience for students. This paper will outline the model while emphasizing the benefits, challenges, and changes Legacy staff has encountered along the way.

Varga, Virág [196] see Szígeti, Anna

Vargas, Amilcar (University of Barcelona), Margarita Díaz-Andreu (ICREA-University of Barcelona) and César Villalobos (UNAM)

[360] *Local Engagement in UNESCO World Heritage Sites: Mexico as a Case Study*

The "critical importance of involving indigenous, traditional and local communities in the implementation of the [World Heritage] Convention" (World Heritage Committee Decisions 31.COM/13A and 31.COM/13B, 2007) reflects discussions that have been taking place in WH since 1994, and has guided much of UNESCO's efforts regarding these communities in World Heritage Sites since. In 1994 social participation became a requirement in the nomination of new World Heritage Sites and since 2008 it has been expected in their management. However, the extent to which social participation has been implemented is a moot point. Inspired by the "Rapid Ethnographic Assessment Procedures" (REAP) method developed by the U.S. National Park Service (Low 2002), our team has conducted fieldwork to examine the situation in archaeological WH sites in Mexico. Methods used by our team include personal semi-structured interviews, focus groups, participant observation and archival research. We will explain some of the results obtained so far and contextualize them in the social and political processes that have taken place in Mexico in the last two decades.

Varma, Supriya (Jawaharlal Nehru University, New Delhi, India)

[167] *Unsettling a Region: Archaeological Landscapes and Seascapes of Saurashtra, Western India*

The peninsula of Saurashtra is a distinctive physiographical region in western India that is surrounded by the sea on all sides except the east, where it is attached to the mainland of South Asia. This square peninsula, virtually a cul-de-sac, is somewhat isolated when compared to the Gujarat plains that are located to its east. Farmers, pastoralists, crafters and traders have left behind their signatures through settling and unsettling in a region, which is characterized by shallow, unproductive soils, high seasonality, recurrent droughts and crop failures. In my paper, I will explore the region of Saurashtra to shift focus of archaeological studies from both North India as well as the Indus Valley Civilization. I examine the archaeology of places, sites and non-sites, as mediated by economic, environmental or physical conditions as well as by social and cultural practices of past communities that have inscribed, both intentionally and unintentionally, the landscapes and seascapes of Saurashtra in the period between the third and first millennia BCE. I use of the concept of "trace" to explore the residues of ordinary people that have been inadvertently left behind and now form part of the archaeological contexts.

Varney, R. A. (PaleoResearch Institute, Inc.) and Linda Scott Cummings (PaleoResearch Institute, Inc.)

[275] *Finding Dung on Prehistoric and Historic Landscapes: Sporormiella in the Pollen Record*

Dung fungal spores (*Sporormiella*) live on grazing animal dung and comprise part of the pollen record in landscape studies. Coprophilous fungi such as *Sporormiella* rely on a cyclic process involving herbivore ingestion of spores with foliage; germination of spores following passage through the gut; and mycelial growth within, and eventual sporulation on the surface of drying dung. Often their recovery in stratigraphic profiles is interpreted to represent megafaunal presence, thus enhancing landscape use discussions to include grazing fauna. Stratigraphic records from the American Great Plains beginning with a site in Oklahoma (21,000 BP), then moving to other locations examine faunal presence from the late Pleistocene and early Holocene until modern times. Recovery of dung fungal spores on groundstone suggests processing animal entrails. At the recent end of the time spectrum, dung fungal spores recovered from historic Iowa privies from neighboring properties suggest keeping livestock on some properties.

Varney, R. A. [174] see Scott Cummings, Linda

Vasantha, Rajesh, Abhayan G.S. (Department of Archaeology, University of Kerala, T), Akinori Uesugi (Kansai University, Japan), Ajit Kumar (Department of Archaeology, University of Kerala, T) and Neha Gupta (Memorial University, Canada)

[167] *Current State of Megalithic Research in Kerala, India*

Megalithic studies in Kerala started with the discovery, excavation and publication of burial site at Chattaparamba in Kozhikode district by James Babington in 1819. While a number of archaeological investigations on Megaliths in Kerala have been carried out since then, very few of them document the location, distribution and nature of these monuments. Megalithic burials are highly visible on the landscape and are often subject to excavation, yet, we currently lack an understanding of the society and the people who constructed these monuments. In recent years, large-scale construction projects and rapid growth in house construction throughout Kerala has led to the destruction of large number of Megaliths. In this context, the Department of Archaeology at the University of Kerala in collaboration with the University of Kansai (Japan) and Memorial University (Canada) is preparing a gazetteer of reported Megalithic sites in Kerala. In this paper, we discuss the Kerala Megalithic Gazetteer Project, the available archaeological data, and excavations and explorations undertaken under the project. We present preliminary efforts to better understand the density and distribution pattern of Megaliths in Kerala in relation to their physical and social landscapes.

Vashisth, Meenakshi (M.Phil., University of Delhi)

[167] *A Study of the Archaeological Landscape of Bairat, Jaipur district, Rajasthan*

Bairat is a region located in the present-day Viratnagar tehsil of Jaipur district in Rajasthan. So far it is known for yielding two Ashokan inscriptions in the nineteenth century and being identical with the mythological Viratnagara of Mahabharata. This paper develops a larger understanding of the history of Bairat by studying its material culture which came into light after post-Independence excavations and explorations. To understand the settlement from about seventh century BCE up to third century CE, I carefully examined ceramics in existing archaeological collections and integrated them with surface finds of a new site Khera-ki-Dhani which was discovered during the field surveys. This integration of sources of archaeological information offers insights into the history of Bairat, helping us contextualize the royal Ashokan proclamations while providing perspective view on Bairat through time—as part of the larger narratives from Mauryas to Mughals.

Vaughn, Kevin (UCLA)

[147] *Moderator*

Vaughn, Kevin [308] see Gorman, Alicia

Vázquez López, Verónica (Yaxnohcah Archaeological Project)

[337] *Ritual activity at the Grazia Complex, Yaxnohcah*

Yaxnohcah is located in southern Campeche, Mexico, and had an important occupation from the Middle Preclassic to the Late Classic period (c. 600 BCE–800 CE). The focus of this paper is the Grazia complex, one of the ten major civic-ceremonial groups. Grazia consists of two monumental platforms featuring a triadic group and a ball court. The complex is located about 2 km southwest of the center of the site. Excavations began in 2016, revealing the presence of several constructive phases, including early platforms built with massive stone blocks, as well as the remains of ritual

activities. A hearth and a ritual deposit with a triadic layout—a cache vessel surrounded by three stones—might be related to the principle of centrality and creation mythology. In this paper, I discuss the importance of the findings at the Grazia complex in a broader perspective, comparing the new data on ritual activity with other contemporary practices throughout the Maya area. Public rituals seem to be related to the process of social integration and the institutionalization of power in the Preclassic period, in an area which played a crucial role in the consolidation of the Maya political landscape.

[337] Chair

Vásquez Pazmiño, Josefina [384] see Stahl, Peter W.

Vega, Enrique [323] see Hendrickson, Mitch

Velasco, Matthew (Cornell University), Loro Qianhui Pi (Vanderbilt University) and Tiffany A. Tung (Vanderbilt University)

[231] *Childhood Diets and Residential Mobility in the Late Intermediate Period, Colca Valley, Peru: A Study of Carbon and Oxygen Isotope Ratios from Dental Apatite*

Around AD 1300 in the Colca Valley of southern Peru, an increasing proportion of elite individuals began to mark themselves as ethnically distinct by elongating the heads of children. This permanent act had far-reaching effects on the livelihoods of modified individuals, especially females, who exhibit more diversified diets in adulthood and experienced lower rates of cranial trauma. The present study complements prior stable isotopic analysis of bone collagen by examining carbon and oxygen isotope ratios from dental carbonate to address two primary research questions: First, did distinct child feeding and weaning practices contribute to the unique life experiences of modified individuals? Second, were social groups based on ethnic, gender, or kinship identity differentiated by dietary and mobility patterns in early childhood and early adolescence? In particular, the comparison of oxygen isotope ratios from human enamel and local water sources in the Colca Valley will test the hypothesis that residential mobility was an integral aspect of women's participation in the agropastoral economy. Finally, stable isotope variation in the Colca Valley is examined in light of evidence from contemporary regions in the Andes that attest to the dramatic effects of late prehispanic ecological and social changes on childhood diet and health.

Velasco, Ernesto [290] see Casar, Isabel

Velazquez, Adrian and Norma Valentin (INAH)

[94] *Reddish Valuable from Far Away: Spondylus princeps in the Ancient City of Tamtoc*

The ancient city of Tamtoc developed in the Huastec region between 400 BC and the early sixteenth century AD. A great amount of shell objects have been found here, some of them made of freshwater mussels that live in the nearby rivers, while other are made of marine species from the relatively close Gulf of Mexico. Some pieces, nevertheless were made of species from the far way Pacific coast, one of which is the bivalve *Spondylus princeps*. In this paper, the results of the analyses made to the objects made of this shell will be presented. They include the study of their manufacturing techniques and their archaeological contexts of finding. On this basis aspects as the origin of their manufactures and their role as luxury items will be discussed.

Velásquez, Antolín [71] see Barrios, Edy

Velazquez-Castro, Adrian [225] see Zúñiga Arellano, Belem

Veldi, Martti (PhD Candidate)

[158] *Biographical Approach for Evaluating Archaeological Landscapes: A Case Study from Estonia*

Since the 1990s, landscape biography as a research method has diversified. The biographical approach expects a thorough study of a certain region in various fields of landscape research, which span far beyond just geography or archaeology. In contemporary approaches to landscape, the limits of the concept of landscape biography are being explored, but also tested. What exactly is a landscape biography? What does it constitute? Is landscape biography just a narration of a specific defined place on the face of the Earth in a defined period of time or does it have a practical output? Is it possible to tell the future by narrating the past? In addition to the traditional landscape narrative, the scope of the current research concentrates on historic land use around archaeological sites and aims to create a system for assessing the archaeological heritage value of certain micro-regions. The aim of the research is to elaborate practical methodology for detecting the most essential elements of archaeological heritage landscape to create an effective concept for landscape preservation through sustainable development. The paper is illustrated by a case study from Estonia.

[158] Chair

Vella, Nicholas [133] see Malone, Caroline

Vellanoweth, René L. [142] see Fonseca Ibarra, Enah Montserrat

Vellanoweth, René L. [371] see Morales, Jessica

Velliky, Elizabeth (Universität Tübingen/University of Western Australia), Martin Porr (Archaeology/Centre for Rock-Art Research and Manag) and Nicholas Conard (Department of Early Prehistory and Quaternary Ec)

[282] *Red Ochre at Hohle Fels, Germany: The Use of Pigment and Space at an Upper Paleolithic Cave Site*

Some of the most informative artifacts regarding early symbolic behaviors in Europe come from Hohle Fels Cave, Germany. Hohle Fels (HF) boasts a detailed Upper Paleolithic sequence, and an extensive array of ochre artifacts. In this project, we systematically investigate the ochre assemblage at HF by quantity, type and modification, and proximity to other archaeological features. The ochre assemblage includes painted limestone pieces, faunal elements, fossils, and potential grindstones with traces of ochre, raw ochre artifacts, and anthropogenically modified ochre pieces. Most un-worked ochre pieces date to the Aurignacian (ca. 44–34 cal. ky BP) layers, where important symbolic artifacts such as the Venus figurine and bone/mammoth ivory flutes were found. Almost all of the modified pieces date to the Gravettian (ca. 27–31 cal. ky BP) and Magdalenian (ca. 12.5–13.5 cal. ky BP). A central part of our investigation assesses whether clear behavioral trends related to ochre manipulation are recognizable throughout the Upper

Paleolithic. By analyzing the contexts in which ochre occurs spatially and temporally, we aim to explore in-depth how early humans interacted with and mobilized ochre materials during the Upper Paleolithic at HF, which has implications for understanding early symbolic behaviors throughout Central Europe and beyond.

Venables, Barney [96] see Scott, Ashley

Vences, Gustavo Jaimes [145] see Nieto, Rubén

Venegas de la Torre, Luis Joaquin (Universidad Autónoma de Yucatán)

[349] *La fotografía aérea con dron como una herramienta para el Registro del Patrimonio Histórico de Yucatán*

Desde hace muchos años, la fotografía aérea ha sido de vital importancia para el desarrollo de la arqueología. Hoy en día, su uso es tan común que podríamos considerarla una herramienta elemental dentro del trabajo arqueológico, ya sea en la etapa de registro, excavación o análisis.

El surgimiento de los Vehículos Aéreos No Tripulados (UAVs o drones), trajo consigo la capacidad de obtener fotografías aéreas de espacios o elementos específicos en poco tiempo y a bajo costo, generando mayores facilidades en la obtención de imágenes que pueden ser procesadas en diversos programas computacionales, poniendo a nuestro alcance una herramienta innovadora para la investigación arqueológica. De esta manera, la presente ponencia tiene como objetivo mostrar las capacidades y la viabilidad del uso de la fotografía aérea con drones como una herramienta para el registro de la arquitectura histórica de Yucatán. Para ello, se expondrán los resultados obtenidos dentro del proyecto "San Pedro Cholul: geoarqueología, historia e industrialización de una hacienda henequenera yucateca de principios del siglo XX" llevado a cabo por la Facultad de Ciencias Antropológicas de la Universidad Autónoma de Yucatán.

Venter, Marcie (Murray State University)

[10] *Not So Strange Strangers in a Strange Land?*

Ceramic evidence combined with obsidian and sculptural data from the archaeological site of Matacanela are beginning to paint an unexpected picture of intra- and interregional dynamics in the Early and Middle Classic Tuxtla region of the southern Gulf lowlands. These data point to an unexpectedly independent political-economic relationship with the nearby center Matacan, but one that may have been created through elite-alliance networks that differently incorporated Teotihuacán-style symbols into local political strategies. In this poster, we consider existing models for political and economic networks in the Tuxtla, how those networks differently incorporated foreign styles in political strategies, and how new ceramic evidence, some of which includes recent NAA characterizations, addresses our evolving understanding of Classic period dynamics.

[10] *Chair*

Venter, Marcie [320] see Montero Mejía, Gabriela

Vepretskii, Sergei [298] see Beliaev, Dmitri

Vera Flores, María del Rocío

[10] *El suelo arqueológico como mercancía: Problemas actuales sobre la conservación arqueológica en la Costa del Golfo*

El suelo que sólo sea visto como una mercancía que otorgue seguridad económica y sobre el cuál no se regule su uso, adquiere una mayor complejidad al ser parte, además, de un contexto arqueológico. En este sentido, uno de los principales retos de la arqueología en México es conservar a largo plazo las zonas arqueológicas que la ley refiere y todos aquellos sitios de gran valor y extensión, que son investigados año con año y que requieren de un diseño de conservación como política cultural, acorde con el territorio y la organización política-económica de su región, en este caso la gran región de la Costa del Golfo.

Verano, John [238] see Goepfert, Nicolas

Verdugo, Cristina (University of California, Santa Cruz), Kimberly Zhu (University of California, Santa Cruz) and Lars Fehren-Schmitz (University of California, Santa Cruz)

[386] *Beautiful Virgins and Male War Captives: The Role of Sex Attribution in Ancient Maya Human Sacrifice at Midnight Terror Cave, Belize*

The prurient element in the popular notion of the Maya sacrifice of "beautiful virgins" during the first half of the twentieth century (Frost and Arnold 1909; Willard 1926) appears to have made researchers wary of the topic of gender in study of human sacrifice. The interest in human sacrifice arose in the 1990s at the same time as the formulation of the warfare hypothesis for the collapse of Maya civilization (Demerast 1990) so that models of human sacrifice tended to assume that victims were largely male war captives. In reality, few large skeletal assemblages related to sacrifice exist to provide hard data on the issue. The Midnight Terror Cave assemblage, consisting of more than 10,000 bones, is one of the few. This paper reports on the detailed examination of all the pelvises in the assemblage using osteological and paleogenetic techniques to shed light on the sexual composition of sacrificial victims.

Vermeersch, Pierre [227] see Martindale, Andrew

Vermillion, Rebekah (Morehead State University [Craft Academy]), Miguel Delgado Ku (Centro INAH Yucatán) and Timothy Hare (Morehead State University)

[9] *Mapping and 3D Modeling of a Terminal Postclassic Site in the Northern Yucatán*

During our 2016 field season, we mapped and created 3D models of several sites in the Northern Yucatán that were scheduled for destruction due to highway expansion. We used unmanned aerial vehicles (UAVs/drones) to carry photographic equipment to collect both vertical and oblique photos of the site. The resulting photos were processed in photogrammetric software to generate an orthorectified photo mosaic and a 3D model of the entire area. These products were integrated into a GIS to facilitate analysis. In this poster, we outline the technology and data processing workflow used and display the resulting products for a Terminal Classic settlement. The settlement consists of a large platform on which approximately twelve structures are located. Our map encompasses, the platform, architectural remains visible on the ground surface, and salvage excavations from several structures and into sections of the platform.

Vermillion, Rebekah [336] see Hare, Timothy

Veth, Peter [302] see Manne, Tiina

Viana, Sibeli (PUC Goiás) and Maria Gluchy (Universidade Federal do Rio Grande do Sul, Brazil)

[45] *Technological Variability in the Ancient Holocene in the Central Plateau of Brazil and Border Southwestern Brazil with Uruguay*
We'll present reflections about the technological variability of two regions of Brazil, the Central Plateau and the southern state of Rio Grande do Sul. Both are dated from the ancient Holocene and the results come from techno-functional analysis applied in lithic materials evidenced in sites of these regions. The Central Plateau is characterized by the Itaparica Techno-complex, composed of instruments with silhouette easily identifiable. The technical design allows a standardized hafting and organization of different functional parts. The defined spatial distribution of this material and its rupture with the Middle Holocene indicates that it is a technical phenomenon that does not exist in other sites in South America. In the area of southwestern border of Brazil with Uruguay, archaeological sites in surface and stratigraphy present a significant technical diversity. Technical systems of production were evidenced, and for each of the modes (façonnage and débitage) there are different predetermined blanks that correspond or not to specific tools. We present technological diversity witnessed in different areas and specific period, indicating multiple technical behavior where a single model is not enough to explain the occupations.

Vianello, Andrea [178] see Tykot, Robert H.

Vicencio, A. Gabriel (Universidad de las Americas Puebla), Aurelio López Corral (INAH Tlaxcala) and Mari Carmen Serra Puche (UNAM)

[88] *Late Formative Obsidian Procurement in Xochitecatl-Cacaxtla*
This study inquires into the obsidian commercial networks of Late Formative in the site of Xochitecatl-Cacaxtla employing an analysis of pXRF on 102 pieces of obsidian artifacts. In addition, we performed a technological approach of the material recovered from ceremonial and domestic contexts in order to know in which stage of the process it arrived. With this, we intend to know how each source was represented throughout the site, revealing the internal maneuvers used by two different settlements in order to better understand both intrasite economic relationships and the interregional commercial system between sites within the Tlaxcala region.

Vicencio, A. Gabriel [215] see López Corral, Aurelio

Vidal Elgueta, Alejandra (Universidad SEK), Luis Felipe Hinojosa (Laboratorio de Paleoecología Universidad de Chile) and María Fernanda Pérez (Pontificia Universidad Católica de Chile)

[222] *Human Selection on Maize Size Traits: A Contribution from the Archaeological Record of Tarapacá, Chile, South-Central Andes*
Maize from Andean region has a recognized complex history, involving ecological and human interaction. Today, while Andean maize shows high morphological and low genotypic diversities, the process involved in its production and selection is unclear. In this work we ask how the morphological and genetic diversity of maize has varied through the Formative Period to the present time in Tarapacá Region, northern Chile? To answer this we analyzed thirty morphological traits and eight microsatellites markers over archaeological cobs and kernels (dated circa 500 BC to AD 1400) and 95 modern ears maize derived from primitive races. Our results show, at phenotypic level, significant differences between archaeological and modern cobs/kernels. In contrast, low genetic diversity between samples was found. These results are consistent with a human selection directed to increase corn size during a short period of time.

Vidal Montero, Estefanía P. (Fulbright-CONICYT Chile, Department of Anthropology, University of Chicago), Francisco Gallardo (Pontificia Universidad Católica de Chile-ICIS), Benjamín Ballester (Université Paris 1 Panthéon-Sorbonne), Gonzalo Pimentel (Instituto de Investigaciones Arqueológicas y Museo) and José Blanco

[134] *Formative Mobilities: Moving through the Atacama Desert, Northern Chile*
Social spheres are constituted by population movements. Mobility entails not only the circulation of material goods, but of people, collective imaginary, experiences, flows of information, and knowledge. In this paper, we examine multiple types of movements through the Atacama Desert during the Formative Period (ca. 500 BCE–700 CE). Here, mobility required displacements whose variability included pedestrian travels, the movement of large llama caravans, and the use of sea lion-skin rafts to sail along the Pacific Ocean, thus involving different material means and encompassing a wide array of incentives. We offer different case studies that challenge monolithic assumptions about mobility in the south-central Andes, often seen exclusively through the lens of ecological complementarity and primarily driven by economic exchange. We question here the spatial and temporal scale of these displacements—from daily to seasonal, from micro to macro-movements—as well as its motivations, which were prompted by different social commitments (cooperation, the creation political ties, and the livelihood of communities, to name a few). Through these case studies, we approach movement and travel as a way of life, and explore how it was incorporated into the social lives of these groups.

Vidal Montero, Estefanía P. [216] see Ballester, Benjamín

Vigano, Claudia [181] see Ferrari, Giada

Villagran, Ximena [153] see Cleghorn, Naomi

Villalobos, César [360] see Vargas, Amilcar

Villalobos Hiriart, José Luis [225] see Gaytán-Caballero, Adriana

Villalpando, Elisa (Instituto Nacional de Antropología e Historia, Sonora)**[84]** *Fishes Swimming in the Magdalena River: Villages and Summit Features in the Middle Magdalena Valley, Northwest Sonora*

At the end of the 1990s, Suzanne and Paul Fish conducted a full coverage survey around the regional center Cerro de Trincheras in the middle Magdalena Valley "to clarify the role of the many smaller or secondary trincheras sites within territorial organization" (Fish and Fish 2007:168). Early Ceramic trincheras sites were located 2.5 to 4 km from its nearest neighbor; all suggest multifunctional and residential occupations in the Magdalena valley, and most of them continued in use in the El Cerro Phase (AD 1300–1450). Summit rock rings are the main architectural feature. El Cerro Phase in the middle Magdalena Valley is marked by the occupancy of Cerro de Trincheras; trincheras sites are more numerous and widespread than Early Ceramic sites. El Cerro Phase sites had corrales with a standardized form which denotes replication and institutionalization of specialized functions, creating a network of integrative trincheras nodes that increasingly interlinked populations. The Fishes interpret summit compounds at Sonora and Arizona as ideologically significant features and move into ethnography for plausible frameworks for testing interpretations. I will discuss if summit structures are a trans-regional phenomenon that include concepts taken by Northwest/Southwest societies who incorporate them in their own traditions.

Villanea, Fernando [92] see Monroe, Cara

Villanueva Ruiz, Denia Berenice**[328]** *The Registry System Implementation for the Heritage Cultural Protection in Latin America: The Case of Mexico*

Archaeological research, such as other areas of knowledge, has used technology as a worthy work instrument. Therefore, in this paper, I do a review of the different instruments that have been developed, implemented and refined over the years to confront the need to know and appreciate cultural material with the final objective to control and preserve the national properties. Also, an objective is to present how the rules, agreements and other development normatives have been accomplished through several projects about stocktaking, cataloging and registry, related to knowledge progress of cultural legacy, which every community has, and how this difficult task has given rise to a wide range of ways implemented in different countries with the same objective: To know that they have.

Villarreal, Alessandra (University of Texas, San Antonio)**[43]** *Community Archaeology and Ancient Ceramics: Developing an Inclusive Research Design in San Jose Succotz, Belize*

Collaborative archaeology is an approach that promotes the inclusion of modern, indigenous communities in the study of the ancient past. In the Maya area, local communities have recently become more involved with archaeological research at multiple stages, including research design, data collection, and community outreach. At the same time, advances in the qualitative and quantitative study of early ceramics have allowed archaeologists to further elucidate ancient Maya chronology, economy, and sociopolitical structure. A project design which integrates these recent developments emphasizes the incorporation of local community knowledge into the study of ancient Maya ceramics. This paper, which offers a broad overview of the history of collaborative efforts in the Maya region, serves as a preliminary discussion of a collaborative project established with a local, traditional potter in the village of San Jose Succotz, adjacent to the site of Xunantunich, Belize. The knowledge produced by this project will allow local potters to incorporate ancient techniques into their craft and advance archaeological understandings of ancient ceramics. Further, this introduction of inclusivity into the design and execution of research will help ensure that the knowledge produced is accessible to actors who have traditionally been excluded from academic discourse.

Villaseñor-Marchal, Antonio [75] see Deiter, Karissa

Villaverde, Valentín [169] see Real Margalef, Cristina

Villeneuve, Suzanne (University of Toronto)**[197]** *Village Aggregation and Early Cultural Developments on the Canadian Plateau: A Case Study from Keatley Creek*

Understanding when and under what conditions aggregation into larger communities with large corporate house organizations, socioeconomic inequalities and specialized ritual structures occurred has been a central theoretical issue in various regions of archaeological investigations. Perhaps the biggest bone of contention in current theorizing is whether these transitions occur when hunter/gatherers accepted claims to privilege on the part of some individuals by consensus to deal with community problems due to environmental stress or population pressure, or whether people were cajoled into participating in systems creating inequality by promises of lucre and a better life. These scenarios contrast the most in terms of the resource conditions under which early cultural developments are expected. Ritual is often invoked in this context as a means of promoting community group solidarity, or to mobilize and justify systems of inequality. Research at Keatley Creek has been investigating these issues through intensive radiocarbon dating and detailed stratigraphic analysis of large house rim midden contexts and ritual structures, combined with GIS modeling of ritual in village or tribal level societies drawing upon ethnographic and archaeological research. Results from this ongoing research offer significant insight to our understanding of early cultural developments among hunter/gatherers.

Villeneuve, Suzanne [258] see Henao, Julian

Vining, Benjamin (University of Arkansas, Fayetteville)**[382]** *Satellite Remote Sensing of Archaeological Environmental Change in the Chicama Valley*

As global ecological change becomes a pressing contemporary issue, it's beneficial to also consider how long-term land use histories have affected current ecologies. Using imagery from several multispectral remote sensing satellites and field verification of detected sites, I describe how legacies from archaeological occupations impact modern industrial sugarcane production in the Chicama valley. Occupation sites and agricultural systems, both extant and remnant, continue to influence sugarcane phenological development. These anthropogenic features result from highly localized changes in groundwater and soil water potential, which in turn produce differentials in plant-available essential nutrients and moisture. In many cases, crop losses result. This remote sensing-aided approach further documents many archaeological features unrecorded in prior surveys. Settlement analysis suggests an abrupt coastward shift in populations between the Moche and Lambayeque cultures; dispersal into more, smaller sites; and an increased reliance on anthropogenic ponds (cochas) in the latter period. These shifts may be linked to changes in groundwater hydrology. Modern small-scale farming and wetlands ecology continue to benefit from anthropogenic wetlands originating in the Lambayeque periods. Both findings show the importance of archaeological land use legacies and path dependence on the modern ecological function of the Chicama Valley.

[382] *Chair*

Vinogradov, Nikolai [323] see Hanks, Bryan

Vischak, Deborah (Princeton University)
[269] *Discussant*

Viviano, Carlos [286] see Haas, Randy

Voelker, Judy
[372] *Discussant*

Vogel, Juliette (Dept. of Archaeology & Historic Preservation)
[361] *Discussant*

Vogelaar, Colton (University of Victoria) and Quentin Mackie (University of Victoria)
[49] *Coastal Predictive Modeling for Early Period Archaeological Sites in a Landscape subject to Rapidly Changing Sea Levels, Quadra Island, British Columbia*

In the Northwest Coast, paleoenvironmental context is essential in the search for late Pleistocene–early Holocene coastal archaeological sites. The dynamic and complex relative sea level history is a key determinant in site discovery. In this presentation I describe how we are using predictive modeling to help overcome the challenges of this dynamic history. This research introduces novel coast-focused variables and methodology to find early period coastal archaeological sites on Quadra Island, British Columbia. Initially, quantitative modeling is used to highlight potential areas for specific temporal and spatial archaeological site types. These highlighted areas are then evaluated by human judgment to include qualitative and subjective aspects of archaeological potential, such as human behavioral models and landform formation processes. Novel variables such as coastal sinuosity and wind fetch serve as proxy indicators for marine biodiversity and coastal exposure respectively, which in turn may be factors related to site location. Presented are preliminary survey results using this predictive modeling theoretical and methodological approach to find early period archaeological sites on Quadra Island.

Vogelaar, Colton [49] see Mackie, Alexander

Volta, Beniamino (University of California, San Diego) and Nikolai Grube (Universität Bonn)
[179] *Classic Maya Politics and the Spirit of Place: Controlling Architectural Discourse at Uxul, Campeche, Mexico*
Settlements are both product and site of innumerable, multilayered, and constantly changing interactions between humans and the material world. At any given moment, the quintessence of a place reflects the prevailing meanings that are associated with it. In this sense, quintessence is inextricably linked to power—over discourse, material, and space. This talk explores the role played by political power in defining the character of the Classic Maya settlement of Uxul, Campeche, Mexico. After establishing itself as an important regional center in the Early Classic period, Uxul fell under the control of the Kaan or “Snake-head” dynasty of nearby Calakmul in the first half of the seventh century AD. This talk suggests that the *esprit du lieu* of Late Classic Uxul was defined by a tension embodied in the built environment of the site. This tension originated from the juxtaposition of “local” places—sites of memory, ritual, and identity—and new public spaces that signaled the incorporation of Uxul into the Calakmul regional state.

Von Baeyer, Madelynn (University of Connecticut)
[274] *The People Who Harvest Together, Live Together: Ethnoarchaeological Considerations on a Late Chalcolithic Archaeobotanical Assemblage from Çadır Höyük, Turkey*

This paper presents archaeobotanical data from the Late Chalcolithic (LC) archaeobotanical assemblage at Çadır Höyük, a mounded site on the north-central Anatolian plateau with almost continuous occupation from the Middle Chalcolithic through the Byzantine period. The analysis will focus on both descriptive and quantitative data from samples dating to around 3600 BCE from a communal cooking area at Çadır. It will examine how archaeobotanical analysis can be used as a line of evidence to determine storage patterns at sites, labor organization, and fuel choice using models of plant use developed from ethnographic work. The paper will also discuss how other lines of evidence, like architectural analysis, can inform or can be informed by the archaeobotanical remains.

von Czerniewicz, Maya [210] see Lenssen-Erz, Tilman

von Petzinger, Genevieve (Dept. of Anthropology, University of Victoria)
[175] *The Shaman in the Cave? Testing for Entoptic Imagery in Upper Paleolithic Geometric Rock Art*

It has been proposed that much of the rock art of Upper Paleolithic (UP) Europe can be interpreted as the result of shamanistic visions and related spiritual practices (e.g., Lewis-Williams and Dowson 1998; Clottes and Lewis-Williams 2001; Lewis-Williams 2002; Whitley 2005). This theory is based on a combination of analogy with modern hunter-gatherer groups, and recent neuroscience studies on the universality of human physiological response when in a trance state. Specific geometric signs found in UP art are frequently cited in these arguments as evidence of entoptic phenomena—abstract shapes seen during an altered state of consciousness—but what has yet to be explored is whether these particular images appear with a great enough frequency and in the appropriate contexts to verify this claim. This paper will address the question of whether the regularity and co-occurrence of geometric sign types identified as potential entoptic imagery supports the theory that UP art is the product of shamanistic visions.

von Petzinger, Genevieve [175] see Chase, Amy

Vorenhout, Michel [224] see Martens, Vibeke Vandrup

Vrydaghs, Luc, Cristiano Nicosia (CReA-Patrimoine ULB, Brussels, Belgium), Yannick Devos (CReA-Patrimoine—ULB, Brussels, Belgium), Alvise Vianello (CNR-IDPA, Padova, Italy) and Christine Pümpin (IPNA Basel, Switzerland)

[275] *Dung Management in Medieval and Post-Medieval Brussels (Belgium)*

During archaeological excavations in the center of Brussels (Belgium), often stratigraphic units containing dung—either omnivore-carnivore, including human, or herbivore—have been encountered. A multidisciplinary approach, comprising soil micromorphology, phytolith analysis and parasitology on soil thin sections, chemical analyses, including GC-MS and phosphorus measurements, was adopted to identify and characterize dung remains. In some cases dung was observed as part of the manure added to pre-urban and urban agricultural and horticultural soils. Under other circumstances, we were instead able to identify the very stable where dung was purposely accumulated for later use (“podstal” or “sunken byre”). In one site we observed the accumulation of dung in an area where waste from latrines and houses accumulated. Such contexts provide important insights on dung management practices and on the value of dung in Brussels between the tenth and sixteenth century AD.

Vujevic, Dario [282] see Zaro, Gregory

Wa, Ye (Cotsen Institute of Archaeology, UCLA)

[279] *A Vertical Loess Cave Dwelling at Yanggouzhai?*

Of all features excavated at the late Neolithic site of Yanggouzhai since 2005—including houses, hearths, postholes, kilns, child and adult burials, and ditches—pits features, known by the generic term “huikeng” or “ash pit” in Chinese archaeology, account for about 80%. Detailed studies of such features are important not only because of their sheer number, but also because their contents are often used as criteria for site dating and chronology. As our excavation of one such feature (H85) shows, understanding their deposit formation as well as the contents of the deposit is essential to deciphering the function of the pits, as well as their relationship to other features found in archaeological contexts. Our study methods include micromorphology, paleobotany, ceramic analysis, and C14 dating of the pit. This approach of the intensive study to one feature has proved to be fruitful and holds promise for future studies in Chinese archaeology.

[279] *Chair*

Wa, Ye [279] see Fox, Mathew

Waber, Nicholas (UBC)

[91] *Measuring Gesture: Stroke Quantification in Lithic Use-Wear Experiments*

The saying “different strokes for different folks” is a literal truism in the realm of lithic analysis and experimentation where stone tools were and are used by individual people whose tool use gestures vary in any number of ways. Until very recently, experimental archaeologists have largely neglected aspects of gestural variation, such as how much force is applied to a tool’s edge, and task-related gestures are most often glossed under the catch-all term “stroke.” “Strokes” are counted and then compared to other “strokes,” often without any further definition. This poster describes a method for precisely measuring tool edge loading without restricting the tool user’s gestural freedom. Using a low-cost, handheld digital force gauge made with open-source hardware and software, it is possible to precisely record and define individual strokes, and relate them to wear observed on experimental lithic tools.

Wady, Megan [319] see Boyd, Matthew

Waggle, Tawnya (Eastern New Mexico University)

[140] *Mobility of Folsom and Late Paleoindian Occupations at the South Bank Portion of Blackwater Draw Locality No. 1*

Research and excavations conducted at the Blackwater Draw Site have largely contributed to our understanding of Paleoindian era life. This study focuses on the lithic artifacts recovered from the South Bank portion of the Blackwater Draw Site to understand the mobility of Folsom and Late Paleoindian occupations. Although there has been extensive fieldwork conducted at the South Bank, the lithic artifacts from these excavations have not been studied as one cohesive assemblage. The entirety of the Folsom and Late Paleoindian assemblages from the South Bank are used to conduct a lithic attribute analysis to identify and compare the mobility of these occupations. This research also spotlights new information concerning South Bank artifacts, much of which is unpublished and unknown to the greater field of archaeology.

Wagner, Mark and Kayeleigh Sharp

[175] *Portable X-ray Fluorescence (pXRF) and Photogrammetric Studies in Illinois Rock Art Research*

Illinois rock art studies conducted in the nineteenth and twentieth centuries typically used drawings, tracings, and print photography to record prehistoric petroglyphs and pictographs. These types of studies have been replaced in recent years by a variety of new methods including digital photography, DSTRETCH enhancement, photogrammetry, pXRF analysis, and other technologies. These new techniques have greatly enhanced our ability to quickly and accurately record rock art sites in comparison to older methods. In this paper we present several case studies that showcase the use of these new methods and their ability to enhance or correct information collected by earlier rock art studies. Of particular relevance are recent (2016)

photogrammetric and 3D modeling studies of several large panels containing hundreds of painted and pecked images at the Piney Creek site (11R26), which the senior author (Wagner) recorded in 2001 through the use of tracing, line drawings, and conventional photography. Comparison of the two techniques demonstrates the clear superiority of photogrammetry and 3D imaging in terms of the reduced amount of time and greater level of accuracy in regard to rock art site recording over more conventional approaches.

Wagner, Stephen

[111] *Discussant*

Wahl, David [337] see Hansen, Richard

Wake, Thomas (Cotsen Institute of Archaeology at UCLA), Lana Martin (UCLA) and Tomas Mendizabal (Patronato Panama Viejo)

[370] *Changing Interpretations of the Archaeology of Caribbean Western Panama*

Recent field and laboratory archaeological findings in Bocas del Toro, Panama offer data that changes and amplifies our understanding of the prehistory of the region. Detailed paleoethnobotanical study, further zooarchaeological examination, preliminary ceramic thin-section analysis, and continuing

ceramic analysis have all produced results that call in to question entrenched assumptions concerning the timing of settlement, the nature of the subsistence economy, trade, exchange and cultural complexity in the region. Bocas del Toro was settled by at least 2 kya. Its inhabitants consumed maize, a variety of tree crops, a diverse array of animals, and were fully incorporated in the greater Lower Central American Interaction Network as evidenced by the presence of diagnostic ceramics derived from Central Panama all the way to southwest Nicaragua and many places in between.

Walden, John (University of Pittsburgh), Michael Biggie (Los Angeles Maritime Institute), Rafael Guerra (University of New Mexico, Albuquerque) and Julie Hoggarth (Baylor University)

[369] *Investigating the Presence of Neighborhoods in Classic Maya Dispersed Settlement Patterns*

Classic Maya settlement patterns can be characterized as dispersed or "low density." Yet among the dispersed house groups scattered across the landscape, patterns of residential clustering can often be discerned. These settlement clusters likely resulted from an array of different forms of interaction which collectively acted as centripetal forces bringing people together. For this reason, Maya residential clusters probably represent extended corporate groups or neighborhoods. Unlike their nucleated urban counterparts in other early states, Maya dispersed settlement patterns present difficulties when defining cluster membership and determining where to effectively "draw the lines" around possible neighborhoods. This presentation explores ways to better delineate dispersed neighborhoods at a micro-regional level through the application of various spatial analyses which have been traditionally used to discern political boundaries and polity affiliation at a regional scale. These techniques are applied to the hinterland settlement patterns of the Late/Terminal Classic (AD 600–900) Maya polity of Lower Dover, Belize, to investigate the presence of neighborhoods and patterns of interaction between households. The results suggest the presence of several distinct neighborhoods structured around large intermediate elite residential and ceremonial centers.

Walden, John [101] see Ran, Weiyu

Walder, Heather (Michigan State University)

[341] *Compositional Analysis of Copper-Base Metal Artifacts from Michigan*

Compositional analysis of copper-base metal artifacts using portable X-ray fluorescence (pXRF) is an accurate and nondestructive way to identify "protohistoric" European-trade items in early contexts and to assess the continuity of native copper object use on historic-era archaeological sites (Dussubieux and Walder 2015). This poster presents new results from pXRF analysis of artifacts from two late seventeenth century archaeological sites in the Upper Peninsula of Michigan: the Cloudman Site, a protohistoric or Early Historic Anishinaabe/Ojibwe camp on Drummond Island, and the Marquette Mission site, a Tionontate village in close proximity to a Jesuit mission at St. Ignace. Copper-base metal artifacts from feature contexts were selected for analysis on the basis of other potentially temporally or culturally-diagnostic trade items from the same features. Results provide new information on the persistence of native-copper metallurgical practices in colonial contexts and the introduction of smelted-copper trade items at these sites, furthering the understanding of interactions among Native American communities as well as European explorers, traders, and missionaries in this area.

[269] *Moderator*

[269] *Discussant*

Walder-Hoge, Zoe (Simon Fraser University)

[171] *An Ethnoarchaeological Approach to Traditional Farmer Knowledge and Fire Ecology in Eastern Tigray, Northern Ethiopia*

This study will conduct ethnoarchaeological interviews of Eastern Tigray rural consultants on traditional farmer knowledge, risk management and fire ecology. The data will enable the integration of farmer knowledge within an historical ecology framework to understand human-environment interactions taking place during the Pre-Aksumite and Aksumite periods (>800 BCE–CE 700). A previous paleoenvironmental study examined extensive charcoalized wood and burned matter in the region, however an ethnoarchaeological study has yet to be conducted as to farmer's potential use of fire. Interviews will concentrate on Elders and other community members practicing non-mechanized agriculture. The research will focus on human agency in regard to risk management and periods of resource stress, most notably from climate, soil erosion and increasing demographic pressures. Questions will probe the significance of cereals and the importance of crop diversity. The study will also document changes in land use and approaches to crop cultivation. The knowledge gained is intended to further elucidate human-environmental interactions of early complex societies in the Horn of Africa. The results will assist in generating hypotheses on the role of human intervention and decision making in past human-environment interactions.

Walker, Bethany

[285] *Localizing the Imperial Grain Economy in Mamluk Syria: Expressions of Village-Level Initiatives in Fourteenth-Century Transjordan*

How did the medieval Islamic state realize its objectives in natural resource management? How can we distinguish the "hand of the state" from that of local initiatives in land use? This paper is an attempt to evaluate planting and watering strategies, differentiating imperial agro-policies from local practice at the village level. The focus is the intensification and diversification of grain production in fourteenth-century Syria. Grain fields were the most valuable of the agrarian iqṭa'āt (grants of tax revenues) assigned to military and administrative officers; they were the financial underpinning of the medieval Islamic state. The history of grain production is one lens through which to study the development of governance in the Mamluk Sultanate (1250–1517 CE). Tall Hisban in central Jordan, a rural site that physically dominates the grain fields of the Madaba Plains, provides a case in point. Excavations there, integrated with textual and multipronged paleobotanical analyses, are revealing ways that village communities, combining traditional know-how and innovation, came to actualize state programs aimed at maximizing, and guaranteeing reliable, grain yields. Grain production is likewise compared to the sugar industry and market-oriented terrace gardening, which were also impacted by state policy and have left physical and textual traces.

Walker, Cam (Archaeological Investigations Northwest, Inc.)

[121] *Dining Out in the Desert: Results from Protein Residue Analysis at the Azraq Oasis, Jordan*

Excavations at Shishan Marsh 1 (SM-1) have provided evidence of a unique ecosystem, along with faunal remains and over 10,000 artifacts made from local flint dating to approximately 250,000 years ago. Forty-six of these artifacts were selected for residue analysis from stratified, in situ deposits. Extractions from these lithic tools were tested for possible protein residues using the technique of cross-over immunoelectrophoresis (CIEP). The SM-1 artifact extractions were run against eight antisera, informed by the diversity of faunal remains at the site: rhinoceros, camel, deer, duck, horse, goat, bovine, and cat. In total, 17 positive results were obtained: rhinoceros (3), duck (3), horse (5), camel (3), and bovine (3). An overview of the findings, methods, implications, and the demonstrated potential for CIEP to reveal family-specific results of protein residue from deep time will be presented.

Walker, Chester [41] see Pantel, Agamemnon

Walker, Debra (University of Florida)**[337]** *The Search for Sierra Red: Discerning Ceramic Diversity at Late Preclassic Yaxnohcah*

The principal ceramic type for the Petén Late Preclassic period, first identified by Edith Ricketson in the 1930s, and dubbed Sierra Red three decades later, has just about the widest distribution of any ceramic type in the Maya lowlands. In particular, the omnipresent simple flaring walled bowl form is virtually synonymous with the period, yet, after five years of excavation at Preclassic Yaxnohcah, Sierra Red remains an elusive minor type. Middle Preclassic Um Phase is well represented as is the Terminal Preclassic Wob Phase. Excluding a population collapse in Late Preclassic Chay Phase, which seems illogical based on massive and continuous construction data, a case can be made for more diversity in Late Preclassic ceramic production than previously recognized. This paper explores the consequences of such a reality in archaeological interpretation of the Late Preclassic era in the Central Karstic Uplands.

Walker, John (UCF Department of Anthropology)**[327]** *Inequality and Taskscape in a Precolumbian Agricultural Landscape*

Raised fields and other earthworks, as parts of archaeological landscapes, can be theorized through Ingold's related concepts of taskscape and lines. In the Bolivian Amazon, such earthworks are the physical remains of group or community activities in the precolumbian past. As such, they are both the products of community tasks, and infrastructure, or resources that in turn afford other community tasks. In conjunction with archaeological survey and excavation, mapping of raised fields and other earthworks makes it possible to characterize trends in the precolumbian landscape across an area of about 10,000 km². About 37,000 individual raised fields have been measured, averaging about 0.27 ha each. When fields are grouped according to simple geographic criteria (such as proximity), groups of fields differ in terms of inequality, by area. The Gini coefficient is used to characterize this inequality, and trends across space are interpreted, in conjunction with results from excavation. Thinking of landscape as both a product of community tasks, or practices, could be useful in understanding similar patterns in the anthropogenic landscape.

Walker, Martin [241] see Colclasure, Cayla

Walker, Samantha**[214]** *Empires and Kingdoms: A Comparative Analysis of Settlement Patterns and Social Organization among the Charter States of Southeast Asia (800–1400 CE)*

The settlement component of the Socio-ecological Entanglement in Tropical Societies (SETS) project assesses the availability and quality of evidence for the structure and organization of dispersed urbanism among a sample of pre-industrial societies within the tropics. This paper compares support population distributions and organization among the kingdoms and empires that correspond to the Charter State era (800–1400 CE) in Southeast Asia. Our study area includes the Dai Viet and Cham kingdoms of Vietnam, the Early Siamese kingdom of Thailand, the Mataram, Kedri, Singhasari, and Majapahit kingdoms of Java, the Chola Empire of South India, the Sinhalese Empire of Sri Lanka, the Khmer Empire of Cambodia, and the Burmese Empire of Myanmar. We summarize the theoretical and methodological foundations of this project and present the preliminary insights of our ground surveys. Emphasis is placed upon how the geopolitical extents of these charter states—and their stability and longevity—are the product of integrative socio-ecological features. This offers a multidimensional view of how the integration of variable power relationships, social structures, and ecological circumstances influence the resiliency of urban systems in Southeast Asia.

Wallace, Henry [335] see Lindeman, Michael

Waller, Kyle (University of Missouri) and Adrienne Offenbecker (University of Calgary)**[237]** *Bioarchaeological Approaches to Kinship and Social Organization at Paquimé*

Variation in cranial and dental nonmetric traits provides a unique method for investigating prehistoric biological variability at Paquimé, Chihuahua, Mexico. Previous biodistance analyses have demonstrated patterns of long-distance gene flow with both Southwestern and frontier Mesoamerican groups, while stable isotope analyses have suggested a pattern of immigration into the site. The primary goal of this study is to determine what the pattern of biological variability tells us about social organization and kinship at the site. To test this question, we perform a series of biodistance analyses. First, determinant ratio analyses demonstrate that females have considerably greater genetic variability than males, possibly suggesting a pattern of patrilocality. Second, we use established family clusters as subgroups, and then compare distance between graves and interindividual biological similarity to test the degree to which locales within Paquimé reflect biological lineages. The results do not demonstrate a consistent pattern: some family clusters appear to reflect multiple generations of lineages, while others reflect a broader range of biological variability. We consider the implications of our biodistance results for evaluating models of the growth and development of leadership at Paquimé.

[237] *Chair*

Waller, Kyle [237] see Offenbecker, Adrienne

Walley, Meghan**[318]** *Queering the Inuit Past: Archaeology as LGBTQ Allyship*

The real-world utility of academic archaeology is frequently called into question. I address this perception by demonstrating that archaeology has unique potential in the sphere of LGBTQ activism. Because archaeology deals in constructing past narratives, it has the discursive power to naturalize or denaturalize existing social structures and identities. While archaeology has a long history of reinforcing normative social categories, archaeologists have recently begun to apply queer theory, which aims to dismantle normative categories, to their interpretations of the past. I argue that if we practice archaeology with the goal of revealing inconsistencies between past and present social norms, rather than projecting normative categories onto the past, archaeology gains the power to legitimize the identities of people living outside of the norms of their society or community. Through an investigation of nonbinary gender as a traditional aspect of Inuit shamanic identity, I have spoken with members of the Inuit LGBTQ community in order to understand how presenting a queer version of the past impacts living people. The results express the possibility and need to investigate queer pasts to gain a fuller picture of past identities and give LGBTQ communities a sense of history grounded in archaeological research.

[318] *Chair***Walling, Stanley (Community College of Philadelphia), Travis Cornish (SWCA Environmental Consultants), Chance Coughenour (Institute for Photogrammetry, University of Stuttgart), Jonathan Hanna (Pennsylvania State University) and Christine Taylor (Rio Bravo Archaeological Survey)****[83]** *Commoner Landscape, Ritual, and Symbolism in the Shadow of Dos Hombres: Recent Investigations at the Site of Chawak But'o'ob.*

A number of seasons of research at the site of Chawak But'o'ob in the southwestern outskirts of the city of Dos Hombres have revealed an architecturally humble community characterized by dense habitation and extensive landscape modification as well as domestic and public ritual. The evidence suggests that the inhabitants of this farming community had an eye toward symbolism in decisions they made about the disposition of domestic and public structures as well as the manipulation of water and soils. The archaeological investigation of this site, which among other things, includes a ball court complex, suggests that meticulous examination of relic lowland agrarian settlement has the potential to reveal evidence for unexpectedly complex systems of meaning among the non-literate members of Maya culture.

Wallis, Neill [278] see Pluckhahn, Thomas

Wallman, Diane (University of South Florida)

[317] *Subsistence Economies at Morne Patate: A Zooarchaeological Analysis of a Colonial Plantation Landscape in Dominica*

From the seventeenth through twentieth centuries, the Caribbean region experienced unprecedented demographic and environmental change, with the rise and fall of sugar monoculture and the institution of chattel slavery. These transformations were a result of power imbalances at many scales, and the economic, ecological and social consequences of the migrations and interactions were significant and long-lasting. During the Colonial Period, enslaved communities developed diverse socio-ecological practices to survive and adapt within the oppressive plantation structure, through the establishment of artisanal economies and creative subsistence strategies. Zooarchaeological data provide insight into these localized histories and offer important perspectives on the human-ecodynamics of plantation landscapes. This paper presents the results of the analysis of faunal remains from the site of Morne Patate, a colonial plantation in Soufriere, Dominica. As a colony, Dominica was known for its difficult terrain, absentee land owners, and its positioning as a locus of conflict between colonial empires. Through an investigation of the subsistence-based practices developed by the enslaved laborers and habitants of the plantation, Morne Patate provides a unique case study to explore the socio-ecological dimension of this contentious political and social setting.

Walls, Matthew (University of Calgary), Pauline Knudsen and Frederik Larsen (Ilisimatusarfik/University of Greenland, Nuuk)

[144] *Revisiting the Morris Bay Kayak: Analysis and Implications for Inughuit Hunting Practices before the Nineteenth Century*

The Morris Bay Kayak is a unique assemblage that consists of kayak fragments and associated hunting equipment that was discovered in 1921 by chance in Washington Land, northwest Greenland. This paper documents results from a collaborative project with the Greenland National Museum to reanalyze and date the Morris Bay Kayak, and to consider how it fits in the current perspectives on Inughuit archaeology. Working with the traditional kayaking community in Greenland, the project reconstructed the kayak's frame and life history, and then modeled the skills through which it would have been used. Comparisons of structural fragments and hunting tools with regional assemblages, along with new AMS radiocarbon dates, suggests that the kayak represents a local tradition of kayaking that was practiced until shortly before the colonial period. This paper will discuss what open water kayak hunting implies about Inughuit subsistence, and the sudden loss of the technology before John Ross's arrival in 1818.

[314] *Discussant*

Wallsmith, Debbie and Jeff Mummert (HistoriQuest LLC)

[189] *Archaeology and Augmented Reality: Applications and Advice*

Digital technology has made archaeological sites and artifacts much more accessible to the general public. Augmented reality (AR) allows visitors to "handle" artifacts and view archaeological features in their exact locations even after the units have been backfilled. Implementation of AR comes at a cost; not just in the planning process but long after the site has been backfilled, the artifacts analyzed and conserved, and the site report written. The discussion will focus on an archaeological project in south central Georgia. Camp Lawton (a.k.a. Millen) was a Civil War prison camp built in mid-1864 to relieve overcrowding at the infamous Andersonville. The prison—from conception to abandonment—existed for just six months. Despite the short occupation, excavations have turned up many unique artifacts. Additionally, there are diary accounts and illustrations of Camp Lawton, drawn by a soldier imprisoned there. At the site's museum, visitors can handle 3D artifacts and see a drawing of the fort stockade in its exact location via the use of augmented reality.

Walser, Joe W., III [219] see Jakob, Tina

Walsh, Matt [50] see Scott, Lindsay

Walsh, Mary-Ellen

[255] *Moderator*

Walsh, Rory (University of Oregon)

[24] *Jeju Island Ceramics as Evidence of Overseas Trade*

The inhabitants of Jeju Island, Korea, maintained active trade routes with societies in the Korean Peninsula, the Japanese Archipelago, and mainland East Asia. These interactions are encoded in material culture, including imported pottery. Instrumental Neutron Activation Analysis provides high-resolution data on ceramic geochemistry that allows for differentiation among local Jeju clay sources, peninsular clays, and those from farther afield. Samples from the earliest known pottery-bearing sites on Jeju through the historical period demonstrate the continuing role of overseas trade in Jeju society.

Walshaw, Sarah (Simon Fraser University), Jack Stoetzel (Rice University) and Matthew Pawlowicz (Virginia Commonwealth University)

[285] *Swahili Agriculture and Power Dynamics in Regional Perspective*

Urbanization along the Swahili coast coincided with an increasing importance of Islam, stone architecture, and materials traded through connections built inland as well as with Indian Ocean merchants. Archaeobotanical data from the town of Chwaka on Pemba Island, Tanzania (AD 1100–1500) suggest that foodways turned toward Asian crops, including rice and legumes, during the urbanization process. Beyond subsistence, crops held political power. Jeffrey Fleisher (2010) has suggested that feasting was integral to the process of negotiating and maintaining political power among stone-town patricians, and historic records report that rice and other crops grown on Pemba were mobilized for political relations in Malindi. New data emerging from further south on the Tanzanian coast at Songo Mnara (Kilwa archipelago) demonstrates a different pattern of foodways, relying less on Asian rice and more on African grains sorghum and pearl millet. Further south still, archaeological and archaeobotanical evidence from the Mikindani region demonstrate a continued reliance on African crops and inland connections. Here we employ data from three regions using multiple archaeobotanical

methods to consider implications for regionalism in subsistence, agriculture, and land use along the Swahili coast in light of the key role food played in supporting, or contesting, political power.

Walter, Richard [181] see Greig, Karen

Walter, Tamra [220] see Martínez, Valentina

Walton Rogers, Penelope [96] see Spindler, Luke

Walzer, Mariah (Hamilton College), Nathan Goodale (Hamilton College), David G. Bailey (Hamilton College) and Alissa Nauman (Hamilton College)

[79] *Prehistoric Mobility Patterns and Geochemistry of FGV Toolstones at Slocan Narrows Pithouse Village and the Upper Columbia River Area*
The work of Charlotte Beck and George T. Jones dramatically advanced toolstone provenance studies from how to conduct field survey, to how to prepare samples for laboratory analysis. Building on their pioneering work, this paper details the beginning of our efforts in sourcing fine-grained volcanic (FGV) toolstones in the Upper Columbia River area of the interior Pacific Northwest. Handheld portable X-ray fluorescence (HHpXRF) instrumentation was used to nondestructively analyze the FGV artifact assemblage from Slocan Narrows Pithouse Village. A systematic sub-sample (N = 20) of the FGV artifacts were then destroyed to form glass beads for wavelength dispersive XRF (WDXRF) analysis. In this paper we provide details on the methodology, and we compare the results of both analytical techniques. Results of WDXRF are expected to provide higher quality data that will enable us to resolve and identify toolstone sources whose compositions could not be resolved in the HHpXRF data because of the lower analytical precision that results from variations in artifact size and geometry. The data from this study supplement a broad examination of the lithic assemblage at Slocan Narrows that aims at defining past lithic procurement and use patterns in the Upper Columbia River Area.

Wanatee Buffalo, Suzanne [341] see Noldner, Lara

Wandsnider, LuAnn (University of Nebraska)

[325] *LandUse6k North America: Report and Implications*

LandUse6k is a consortium of archaeologists, historical geographers and historians engaged in synthesizing land use data for various slices of time, to be used to improve the efficacy of climate models. These efforts recognize the large impact that anthropogenic land cover change has had on past climate and climate change trajectory. We report on efforts to characterize land use through time for North America describing methods and issues. We estimate how these characterizations allow for more accurate climate models.

Wang, Chunxue, Quanchao Zhang (Research Center of Chinese Frontier Archaeology), Yao Li (Research Center of Chinese Frontier Archaeology), Ningning Liang (Research Center of Chinese Frontier Archaeology) and Xing Gao (Institute of Vertebrate Paleontology and Paleoanth)

[116] *Archaeological Study of Ostrich Eggshell Beads Collected from Shuidonggou*

Ostrich eggshell beads and fragments collected from Shuidonggou (SDG) reflect primordial art and symbolic behavior of modern humans. Based on stratigraphic data and OSL dating, these ostrich eggshell beads probably date to the Early Holocene (10 ka BP). Two different prehistoric manufacturing pathways are usually used in the manufacture of ostrich eggshell beads in the Upper Paleolithic. According to statistical analyses of the characteristics of ostrich eggshell beads, Pathway 1 is identified from the SDG collections. In pathway 1, blanks are drilled prior to being trimmed to rough discs. These objects exhibit great potential for the study of the origin of primordial art and the development of ancient cultures, and provide important data for studying behavioral options adopted by hominids in the SDG area. In addition, they bear important implications for the origin of modern humans in East Asia.

Wang, Hua (Shandong University), Jing Zhou and Ruin Mao

[117] *Community Memories? Ritual Animal Use of "Qijia Culture," Evidence from Mogou Cemetery, Lintan County, Gansu Province, China*

This study focuses on human ritual animal use behaviors of Qijia communities, with the study of animal bones recovered from the Mogou Cemetery in Gansu Province. More than 1,600 tombs have been excavated at the Mogou site. Since multiple burials with a few individuals of both sex and different ages were common and human bones were clumped together, most burials were classified as multiple and/or secondary burials. Animal offerings were also common in these burials, and animal bones were found either in the burial fills, in the side chambers, or beside the human remains. With application of different zooarchaeological methods and approaches to the animal bones, we have the following patterns and interpretations: 1) Qijia communities prefer pig mandibles rather than cattle and sheep bones, although the later species may be more important for subsistence practices, 2) pigs were domesticated and pig mandibles were probably accumulated for a long time rather than mass killing before the ritual ceremony, and 3) the mass use of pig mandibles may be interpreted as community memory behaviors of Qijia Communities.

Wang, Minghui (Institute of Archaeology, CASS) and Dexin Cong

[115] *Migration and Diversity in Ancient Xinjiang: A Multidisciplinary Approach to the Investigation of Adunqiaolu Population*

The Adunqiaolu site, located in western Xinjiang, belongs to the early Bronze Age and dates to the nineteenth–seventeenth centuries BC. Archaeological evidence suggests that this group of people may have come from southern and/or southwest Siberia, north of Tianshan. Applying both cranial-metrics and aDNA analysis, this study explores regional variations in western Xinjiang and their relationships to other ancient populations. Ancient DNA analysis indicates that their genes are mainly European, specifically Spanish and German, and the same sequences recovered from human bones dating to the beginning of the Neolithic. However, in the process of migration and through time, there are small amounts of Mongolian gene admixture. Preliminary craniofacial morphological analysis shows that their physical characteristics are very similar to the ancient European type. Compared with modern Eurasian populations, Adunqiaolu ancient population is on a branch of the Europa group, having close genetic affinities with Iranians and Europeans. They show a relatively pure European genetic structure.

Wang, Qingzhu, Thomas Fenn (Yale University), Hui Fang (Shandong University), Xuexiang Chen (Shandong University) and Jianfeng Lang (Shandong University)

[287] *pXRF Examination of Shang-Dynasty Bronzes from the Daxinzhuang Site, Shandong*

In this paper I present the preliminary results of pXRF analysis of Shang-Dynasty bronzes from the Daxinzhuang site (1400–1046 BC), Jinan, Shandong province. The Daxinzhuang site has been receiving considerable research interests since the 1930s, especially when the high elite burials were excavated in 2003 and 2010. Much research has been focused on these burials and the elaborate bronzes, but there has not been any research on the chemical composition and casting techniques of the bronzes from the site. The pXRF data from the Daxinzhuang site, together with the published data from Zhengzhou and Anyang, provides a new perspective to explore the interaction of people who lived at the Daxinzhuang site and those of the central Shang power in Henan.

Wang, Tingting (University of Chinese Academy of Sciences), YaoWu Hu (Department of Scientific History and Archaeometry, Benjamin Fuller (Department of Scientific History and Archaeometry, and Dong Wei (Research Center for Chinese Frontier Archaeology,)

[72] *Tianshanbeilu and the Isotopic Millet Road: Reviewing the Late Neolithic/Bronze Age Radiation of Human Millet Consumption from North China to Europe*

The westward expansion of human millet consumption from north China has important implications for understanding early interactions between the East and West. However, few studies have focused on the Xinjiang Uyghur Autonomous Region, the vast geographical area directly linking the ancient cultures of the Eurasian Steppe and the Gansu Corridor of China. Here a Bronze Age isotopic study in China is presented about the key site of Tianshanbeilu, in eastern Xinjiang. The vast range of stable carbon isotopic values on Tianshanbeilu human remains provides direct evidence of unique dietary diversity and consumption of significant C4 resources (millet). Tianshanbeilu's results are then analyzed with respect to 52 Bronze Age sites from across Eurasia, to investigate the spread and chronology of significant human millet consumption. This isotopic survey found novel evidence that the second millennium BC was a dynamic period, with significant dietary interconnectivity occurring between north China, Central Asia and Siberia. Further, we argue that this "Isotopic Millet Road" extended all the way to the Mediterranean and Central Europe, and conclude that these C4 dietary signatures of millet consumption reflect early links and cultural interactions between inhabitants of modern-day China and Europe in the Bronze Age.

Wang, Tingting [30] see Fuller, Benjamin

Wang, Weilin (Shaanxi Provincial Institute of Archaeology)

[279] *Understanding the Settlement Structure of the Middle Yangshao Period (Miaodigou Phase) Based on Recent Archaeological Discoveries in the Wei River Valley*

As one of the most influential archaeological cultures in prehistoric China, the Miaodigou Phase of the Yangshao Culture has been found widely in many regions. During the Miaodigou Phase, a common cultural identity appeared across China for the first time, which had great significance for the later formation of Chinese civilization. However, archaeological research has until recently been limited to the study of ceramic styles. In recent years, investigations at the Yangguanzhai site in Shaanxi have uncovered a moated settlement with a west gate, a central reservoir, and a large adult cemetery separated from the settlement, while projects at other sites in the Wei River Valley have found large single-room house foundations of the same period. These discoveries have shed light on the internal structure of Miaodigou Phase settlements, and have shown that during this period, dramatic social change occurred, large sites appeared, and a settlement hierarchy began to form. The structure of large settlements also became standardized, and symmetrical site plans appeared. The discovery of large houses also represents early social stratification, and the predominance of single burials is an evidence of the appearance of nuclear family structures.

Wang, Yayi (Research Center for Chinese Frontier Archaeology of Jilin University), Quanxia Chen (Research Center for Chinese Frontier Archaeology o) and Chunxue Wang (Research Center for Chinese Frontier Archaeology o)

[116] *Zooarchaeological Research of Oracle Bones from Lower Xiajiadian Culture*

Lower Xiajiadian Culture is an early Bronze Age archaeological culture (4000 BP) in Northern China, located at western Liaoning and southeastern Inner Mongolia. This study explores two different kinds of oracle bones from this cultural period: 1) made of cattle scapular was thought to have been burnt in divination, and 2) bone of a mid- to large-sized mammal hoof, thrown during divination. The latter has been scarcely mentioned in the previous research and has not usually been treated as an oracle bone. Through use of zooarchaeological methods, literature comparisons and ethnoarchaeology these two kinds of oracle bones are examined in order to explore human behavior of divination in the Lower Xiajiadian Cultural period.

Wang, Yiru and Hong Zhu (Research Center for Chinese Frontier Archaeology)

[115] *Preliminary Investigations of Human Remains from the Neolithic Gouwan Site in Henan China: Examples of Trauma and Stress*

Traumatic injuries and other osseous evidence of stress are important factors that reflect the health status of past populations. Human skeletal remains excavated from the Gouwan (99 human skeletal remains in total), a Yangshao culture site (ca. 5000–3000 BC) in Xichuan, Henan Province were examined macroscopically for the evidence of skeletal trauma and stress using a biocultural approach. Trauma was investigated to reveal possible types, causes and rigor of activities in this sedentary agricultural community. Additionally, systemic stress indicators such as linear enamel hypoplasia, cribra orbitalia, and osteoperiostitis were also examined to explore childhood and adult lifeways. Comparing with other contemporary populations, our results show that individuals of the Gouwan site experienced elevated risk of trauma in the lower spine, especially the women, suggesting heavy physically-demanding and repetitive activities. High systemic stress in childhood also indicates harsh environmental/social living conditions at the Gouwan in the Neolithic.

Ward, Sheila [83] see Hart, Thomas

Ware Van der Voort, Madeline (University of Nevada, Reno)

[79] *Early Holocene Leporid Processing at the LSP-1 Rockshelter, Oregon*

Human occupation of the Little Steamboat Point-1 (LSP-1) rockshelter in south-central Oregon began ~9,600 cal BP. Artifacts recovered from the pre-Mazama deposits include a faunal assemblage comprised primarily of leporid remains and a lithic assemblage dominated by informal flake tools. I designed and conducted an experiment using replicated obsidian flake tools to identify leporid processing strategies employed by Early Holocene occupants. I performed hide, carcass, and meat processing tasks with the replicated tools on farmed meat rabbits and documented the microscopic use-wear traces of these activities. I then compared the replicated use wear with wear present on 35 obsidian flake tools from pre-Mazama deposits and found that hide processing, including both scraping and cutting, was the most common activity performed at the site. Leporid carcass processing was the second most common activity. These results suggest that the occupants of LSP-1 not only consumed and processed leporid carcasses, but also prepared leporid hides for rabbit skin blanket production.

Warinner, Christina [69] see Ziesemer, Kirsten

Warmlander, Sebastian (Cotsen Institute of Archaeology, UCLA)**[282]** *Analysis of Bones and Objects from the Viking Age site of Hrísbú, Iceland*

At the Hrísbú site, located in the Mosfell valley just a few kilometers outside Iceland's capital Reykjavik, the Mosfell Archaeological Project has excavated a tenth-eleventh century farmstead including a traditional Viking Age longhouse, a farm church with an associated cemetery, and a pagan cremation site. At the cemetery and the cremation site human remains in varying degrees of preservation have been unearthed, while in the longhouse a rich material record has been uncovered consisting of e.g., lithic tools, glass beads, animal bones, and occasional metal items such as knives, nails, and keys. In my doctoral research I am using bioarchaeological, archaeometallurgical, and conservation science techniques to analyze this material, in order to better understand the history, living conditions, level of technology, and trade interactions of the inhabitants of the Hrísbú farmstead. Some comparisons with historic written documents are made. This paper presents a first round of results from the ongoing research.

Warnacutt, Camille [341] see Hoffman, Brian

Warner, John**[272]** *Social Memory and the Development of Monumental Architecture in the Southern Jequetepeque Valley, Peru*

Numerous theoretical concepts associated with social memory have been employed by archaeologists working throughout the world as a means of explaining continuities and discontinuities in the archaeological record. These social memory-based approaches are varied and include specific avenues of inquiry such as how social memories were actively manipulated for political gain; the role played by monumental architecture in the coalescing of shared memories; and the interrelationship between social memories and architectural forms. Focusing primarily upon monumental architecture, this paper will examine the pivotal role played by social memory in the formation of the dynamic archaeological landscape located in the southern Jequetepeque Valley, Peru.

[272] *Chair*

Warner, John [359] see Huntington, Yumi

Warner, Mark (University of Idaho)**[348]** *Class and Reproductive Control: Birth Control Access and Hygiene among Prostitutes in Turn-of-the-Century Northern Idaho*

Excavations of two brothels in the northern Idaho town of Sandpoint presented a unique opportunity to explore the nuances of economic differences in the lives of two groups of prostitutes. Over 100,000 artifacts were recovered, providing a rich accounting of a brothel that catered to local mill workers and a brothel whose clientele was more affluent. Further, such a large volume of materials resulted in the recovery of relatively esoteric materials such as douching nozzles and a variety of products that, as a group, suggest a greater degree of reproductive control among the women working in the more affluent brothel.

[291] *Discussant***Warner-Smith, Alanna****[159]** *A View from Somewhere: Mapping Nineteenth-Century Cholera Narratives*

Several scholars have explored the role of the empirical sciences in colonial contexts; far from a neutral study of the world, they were actively making and remaking material, social, and geographic boundaries. Cartography was part of these boundary-making practices, as the varying positions and views of actors engaging with the world are dissolved into the singular, authoritative view offered by the map. Studying a cholera epidemic that moved through the Caribbean in the 1850s, I consider how archaeologists might employ mapping technologies while also keeping in view postcolonial and feminist concerns for positionality, scale, and the situated nature of knowledge. Through the use of ArcGIS and its time-enabled feature, I map the ways in which primary and secondary sources describing the experience of cholera and the disease's movement spatialize the epidemic. More specifically, I probe the scale at which these varying narratives report the epidemic to determine whether it is understood as a broad, regional event or at the level of specific colonies or islands. In exploring these cholera narratives, I raise questions about the concept of the archaeological site, problems of scale, and the power (and limitations) of maps to represent "views from somewhere."

[159] *Chair***Warren, Matthew (University of Texas at San Antonio)****[56]** *Maintaining an Imperial Borderland: Inka and Indigenous Activities and Interactions in a Threatened Eastern Andean Valley*

In the final decades before the Spanish invasion of the Andes, the Inka Empire struggled to maintain its eastern frontier against the imminent threat posed by the invading lowland Chiriguano peoples. Located within this sparsely populated and loosely connected borderland region was the settlement of Pulquina Arriba, an Inka tampu (waystation) strategically constructed along a preexisting indigenous road network that ran adjacent to a rich river valley. The area's inhabitants were involved in local agricultural operations, and the tampu seems to have been an important component within the infrastructural network supporting Inka colonial activities across the eastern Andean valleys. This talk will present the results of a regional survey and targeted excavations conducted in the vicinity of the Inka site, specifically addressing 1) the Inka and indigenous settlement styles and patterns determined within the study region, 2) the types of activities (economic, military, etc.) in which indigenous groups and the Inkas alike were engaged during their occupations of the area, and 3) the extent to which Inka colonial undertakings affected preexisting indigenous sociopolitical structures and the corresponding implications of these changes.

[56] *Chair***Warren, Shannon (George Washington University), Michael Ziegler, Silindokuhle Mavuso (Evolutionary Studies Institute, University of the), Tamara Dogandžić (Department of Human Evolution, Max Planck Institut) and Kathryn L. Ranhorn (Center for the Advanced Study of Hominid Paleobiol)****[87]** *Mapping MSA Deposits: Regional Geological Investigation of Upper Chari Member Sediments in the Ileret Region, East Turkana, Kenya*

The Ileret region of the Koobi Fora Formation (KF Fm.), located in Kenya's Turkana Basin, has historically been the focus of extensive archaeological research. Mid-Late Pleistocene units have previously lacked defined sedimentary beds due to an understudied unconformity of the upper Chari Member (1.34 Ma to 10 Ka). This represents a substantial limit to Middle Stone Age (MSA) research. Recent fieldwork (2016) incorporated a geoarchaeological survey of the upper Chari Member. Here we describe and map the associated lithologies and stratigraphic markers of this sedimentary package. We identify a major unconformity in the upper Chari and correlate the stratigraphic and structural features of this sedimentary unit across space in Ileret. Importantly, we associate the angular unconformity that defines the lower boundary of this unit with in situ and deflated MSA artifacts. This sedimentary

unit (SSM) underlies Holocene sediments and sits uncomfortably above volcanic ash, allowing a robust chronostratigraphic framework for the SSM and associated MSA artifacts. The study of SSM provides geoarchaeological and paleogeographical context regarding tectonic setting and controls of sedimentation during this time in the stratigraphic sequence of the KF Fm. This research was supported by IRES grants 1358178 and 1358200 from the U.S. National Science Foundation.

Warren, Shannon [153] see Ziegler, Michael

Warrick, Gary

[256] *Discussant*

Waselkov, Gregory (University of South Alabama)

[385] *Bear/Human Relationships in Southeastern Native North America: Creating Archaeological Models from Historical Accounts*

Historical accounts and ethnographic studies of the Indians of greater southeastern North America dating from the sixteenth to twentieth centuries contain abundant information on native people's attitudes toward black bears (*Ursus americanus*). These records provide a basis for inferences about changes in subsistence exploitation of bear populations in the Southeast over the last five centuries, while offering clues about longer-term non-subsistence relationships between bears and humans that developed over millennia. The unique roles of bears as liminal beings—at times other-than-human, a third gender, intermediaries between plants and animals—have barely been explored by archaeologists. Rethinking bears from southeastern Native North American perspectives opens new lines of inquiry for archaeologists.

[385] *Chair*

Washburn, Eden (University of California Santa Cruz) and Lars Fehren-Schmitz (University of California Santa Cruz)

[245] *A Molecular Anthropological Reexamination of the Human Remains from La Galgada, Peru*

The archaeological site of La Galgada is located on the eastern bank of the Tablachaca River in the highlands of Northern Peru. The site was dated to both the Preceramic period and Initial period through a combination of detailed archaeological investigation of the site complex, and the use of radiocarbon dating of material collected stratigraphically. Human remains found at the site were also categorized into these two periods based on stratigraphic location. However, recent radiocarbon dating of the human skeletal remains found at the site contradicts the initial dating results. In light of the time period discrepancies, questions surrounding the relationships between individuals, including whether individuals buried at the site were local vs. nonlocal, were addressed by reanalyzing ancient mitochondrial and nuclear DNA of the individuals dating to both time periods. Additionally, through collagen extracted from bone samples, stable carbon and nitrogen isotopes were measured in order to reconstruct changes in diet, with the goal to potentially shed light on the social organization present at La Galgada. Data from this study will provide key information into understanding the occupancy and use of this site, as well as provide insight into the possible reuse of the site as a burial location.

Watanabe, Aldo [29] see Castillo Butters, Luis

Watanabe, Shinya (Nanzan University, Japan)

[170] *Sociocultural Changes in Cajamarca Region during the Early Intermediate Period and the Middle Horizon*

In this paper we discuss the chronology of the Cajamarca culture of the Peruvian Northern Highlands to consider the social dynamics during the Early Intermediate Period and the Middle Horizon. We present the excavation data from the two archaeological sites, Complejo Turístico Baños del Inca and El Palacio that correspond to the period from the final part of the Early Cajamarca Phase to the Middle Cajamarca Phase. The Cajamarca culture during the Middle Cajamarca Phase A (AD 600–750) presents maximum cultural integration as indicated by the characteristics of kaolin ceramics and settlement pattern, while we can observe the ceramic diversity during the Middle Cajamarca Phase B and C (AD 750–950). We analyze the subterranean canals of the two sites that would indicate the climatic condition of those periods. Finally we consider the character of the Cajamarca culture and society. The Cajamarca presents cultural continuity and flexibility as long as 1,600 years and it contrasts with the vulnerability of other cultures as Moche and Lima.

Waters, Michael (Texas A&M University)

[226] *The Emerging 13,000 to 15,000 cal yr BP Archaeological Record of North America South of the Continental Ice Sheets*

Ruth Gruhn was an early advocate for a human presence in the Americas prior to Clovis. Gruhn and her late husband, Alan Bryan, excavated and reported on early sites in both North and South America and championed the Pacific coast as the route taken by the earliest people to reach the Americas. Their predictions have become a reality. Genetic and geological evidence is supporting a coastal migration route into the Americas. Recent discoveries at the Page-Ladson site, Florida, the Debra L. Friedkin site, Texas, and other sites, as well as a number of genetic studies support an occupation of the Americas by at least 15,000 cal yr BP; some 2,000 years before Clovis emerged on the North American landscape. The revision in our understanding of the timing of the arrival of humans to the Americas at the end of the late Pleistocene and the route they took has its roots in the early pioneering work of a courageous and visionary woman—Ruth Gruhn.

[6] *Discussant*

[226] *Chair*

Waters, Michael [81] see Carlson, David

Watkins, Christopher (Arizona State University), Christopher Garraty (Logan Simpson Design), Travis Cureton (Logan Simpson Design), Dave Bustoz (Logan Simpson Design) and Erik Steinbach (Logan Simpson Design)

[335] *The Path of Hua'm A Nui: Aggrandizement among the Classic Period Phoenix Basin Hohokam*

O'Odham oral histories describes the overthrow of Hua'm A Nui (Yellow Buzzard) and other arrogant rulers of platform mound villages in the Phoenix Basin. These oral histories are consistent with archaeological data that point to increasing social stratification during the Classic Period. This paper addresses the question of how the household-based egalitarianism of the Preclassic developed into Late Classic hierarchy. Leveling mechanisms that previously channeled aggrandizers into socially acceptable prestige-building began to break down during a period of instability and uncertainty of the Preclassic to Classic transition. Aggrandizers gradually reshaped Hohokam social organization to their own ends—a process that culminated in the Late Classic period with elites living on platform mounds constructed by others. An example of aggrandizement was recently identified during excavations at the village of La Plaza in Tempe. A regular alignment of several puddling pits immediately adjacent to the platform mound suggests that construction

and/or maintenance of this structure was a well-organized group activity. These Late Sedentary/Early Classic pits were last used after communal winter canal maintenance but before household-based spring planting, suggesting that an aggrandizing work boss appropriated and redirected canal labor crews to work on the platform mound.

Watkins, Tia B., Rafael Guerra, Rosie Bongiovanni and Kirsten Green

[267] *Living at the Ritz: Investigations of the Palace Complex at Lower Dover, Belize*

Palatial complexes are distinct architectural features within ancient Maya civic ceremonial centers. Maya palaces are commonly multi-roomed complexes featuring attributes such as corbelled roofing, benches, private courtyards, and other decorative attributes. Archaeologists suggest palatial complexes serve as multifunctional spaces for the elite residents. These functions include residential space as well as ritual space for events such as feasts, dances, and other social events. Excavations at the Late Classic site of Lower Dover, located in the Belize Valley, revealed the presence of many of these attributes. This paper discusses results of recent excavations conducted under the auspices of the BVAR Project during the 2016 field season in the palace complex at Lower Dover. The data recovered contributes to our understanding of the site's occupation chronology as well as structural layout and function of the palace. This research further enhances our understanding of Lower Dover's position within the political landscape of the Belize Valley during the Late Classic period.

Watling, Jennifer [62] see Shock, Myrtle

Watling, Jennifer (University of São Paulo), Eduardo Góes Neves (University of São Paulo), Guilherme Mongeló (University of São Paulo) and Thiago Kater (Federal University of Sergipe)

[327] *From the First to the Last Terras Pretas: Changes in Cultural Behavior and Terra Preta Formation in the Upper Madeira River, Southwest Amazonia*

Terras pretas (TPs) are arguably the most visible and widespread artifacts of precolonial occupations in Amazonia. Accumulated as the result of waste management practices by at least partly sedentary populations, they are seen to mark the beginnings of landscape domestication and more agricultural-based societies starting ca. 3000 BP. On the bluffs of the Upper Madeira River, exceptionally early TP deposits were found dating more than 3,000 years before TP sites in the rest of the basin. While differing substantially from later TPs in the same region in terms of composition and depositional context, some have linked these early TPs to manioc agriculture; however, the cultural behaviors and degrees of intentionality that formed these first dark earths are little understood, and mounting evidence suggests manioc domestication occurred long before TP sites appeared. We discuss recent archaeological and archaeobotanical investigations at Teotônio site (Porto Velho, Rondônia) which has preceramic TP occupations dating from ca. 6500 cal. BP, followed by ceramic TP occupations (3000–500 BP), and where a super-abundance of riverine resources made it an important geographical and social landmark throughout history. We documented plant resource use and environment at Teotônio to better understand the different cultural behaviors involved in TP formation over time.

Watrall, Ethan (Michigan State University)

[18] *Building Scholars and Communities of Practice in Digital Heritage and Archaeology*

As digital methods have become more ubiquitous in archaeology, the challenge of teaching those methods has become important. Beyond the question of how and what we teach, however, there is an equally important challenge—how do we build communities of practice populated by scholars who are connected through a shared perspective on both the methods and the thoughtful application of those methods. It is within this context that this paper will explore an approach developed at Michigan State University that speaks to both teaching (and learning) digital methods and the development of communities of practice in which those methods are relevant. The approach itself is informed by the activities in three separate venues: The Cultural Heritage Informatics Graduate Fellowship Program, the MSU Department of Anthropology Digital Heritage Fieldschool, and the National Endowment for the Humanities funded Institute for Digital Archaeology Method & Practice. Ultimately, the goal of this talk is not just to discuss the Michigan State University approach, but to suggest a series of best practices for building capacity and community among students and scholars in digital heritage and archaeology that could be adapted and adopted in a wide variety of institutional, professional, or scholarly settings.

[312] *Discussant*

[18] *Chair*

Watson, Adam (American Museum of Natural History), Patricia Gilman (University of Oklahoma), Douglas J. Kennett (Pennsylvania State University), Peter Whiteley (American Museum of Natural History) and Stephen Plog (University of Virginia)

[130] *The Exotic and the Sacred: Evidence for Ritual Uses of Birds and Long Distance Exchange at Chaco and Mimbres (AD 800–1200)*

Birds are key actors in Pueblo narratives of emergence and symbolize the six sacred directions in Pueblo cosmology and in some instances religious sodalities and societal divisions; bird feathers are powerful offerings to the supernatural, carrying prayers to the gods who in turn use them for adornment. Simply put, birds are central to modern Pueblo cosmology and social and religious life. Similarly, iconographic representations and the ritual treatment of avian species such as the Scarlet Macaw (*Ara macao*) and Golden Eagle (*Aquila chrysaetos*), evident in the archaeological record of Chaco Canyon and the Mimbres region, reflect the ceremonial importance of birds to Ancestral Pueblo peoples. This paper investigates the differing ritual uses of birds in Chacoan and Mimbres society through new AMS radiocarbon dates and stable isotope assays and considers the implications of these new data for our understanding of the development of long distance networks and the rise of social elites and religious specialists.

Watson, Caroline [79] see Jones, Eric

Watson, James (University of Arizona), Ivan Munoz (Universidad de Tarapacá) and Bernardo Arriaza (Universidad de Tarapacá)

[143] *Biocultural Evolution of the Oral Complex in Coastal Atacama and the Interplay of Selection, Plasticity, and Population Histories*

Indigenous groups have inhabited and exploited the coastal valleys of the Atacama Desert since Paleoindian times. Contact with the altiplano began early on but marine-based diets were eventually supplemented by agricultural adaptations as influence turned to population movement over time. We propose that the oral complex was likely subject to some degree of selection early in the sequence in response to dietary demands, but would have been relaxed as diet diversified and softened. This trend would subsequently have been disrupted by the influx of different populations from surrounding areas. We test these hypotheses by examining crown dimensions, evidence for decay and defects, and wear rates in a sample of 591 individuals (15,398 teeth) from archaeological sites in the Azapa Valley of northern Chile that span most of the precontact cultural sequence in the region. Results indicate that social changes over time, particularly diet composition and food consistency, caused steady increases in decay and defects. In contrast tooth wear was variable across time likely reflecting the continued consumption of local marine resources. Finally, fluctuating crown dimensions, enamel damage, and evidence for directional asymmetry may reflect the complex interplay between relaxing selection and gene flow.

Watson, Jessica**[319]** *Cultural Dimensions of Food Procurement on Martha's Vineyard*

Archaeology along the northeastern coast of the United States has often focused on island and coastal industries, with particular emphasis on shell midden deposits. Subsistence-focused research shows us that seafood played a large role in prehistoric diets, yet these studies rarely focus on the cultural dimensions of these foods. Faunal remains on Martha's Vineyard show that early residents ate a diverse selection of land and sea animals. Identified bones reveal a broad diet of mammals, including White-tailed deer (*Odocoileus virginianus*) and canids; fish, ranging from inland freshwater species to marine species; and birds, including terrestrial, nearshore, and offshore taxa. These fauna have previously been studied for their basic dietary and environmental data. In this presentation they will be examined in terms of their cultural role in prehistoric settlements on the island. Analysis looks at the social aspects of food procurement, processing, and discard during the Archaic and Woodland periods. Issues discussed include the role of domestic dogs (*Canis familiaris*) in food procurement, gendered roles of offshore bird hunting, and trade and transportation of animals to the island. This research incorporates stable isotope analysis with traditional zooarchaeological data to better address the role of food in social identity and trade.

Watson, Lucia Clarisa (Universidad Nacional Autonoma de Mexico), Krzysztof Makowski (Pontificia Universidad Católica del Perú) and Jessica Christie (East Carolina University in Greenville)
[272] *Constructing Social Memory: Inca Politics and Sacred Landscape in the Lurin Valley*

We will discuss the characteristics and scope of Inca politics in the Lurin Valley by focusing on the results of excavations carried out by Makowski (2016) in Pachacamac with its famous Imperial Inca temple and oracle, as well as in the administrative center Pueblo Viejo-Pucara. The comparison of landscape transformed by Imperial infrastructure between the Highlands of Cuzco (Christie 2016) and the lower Lurin Valley allows to reconstruct the mechanisms through which social memory was channeled for political purposes which were similar in both cases, even though the forms and techniques of ceremonial architecture were so different due to the separate cultural origin of the builders and users of these spaces. In Pachacamac and Pueblo Viejo, the Inca administration constructed plazas and compounds with restricted access, each one of which probably served a specific population group. The location of the plazas and communication axes maintained a direct visual connection with specific mountains and rocks which were modified and transformed into new huacas incorporated in the Imperial cult. In this new architectural setting, ritual networks of blood-related, ethnic, and ceremonial kinship as well as political compromises were sealed, negotiated, and affirmed through social performance.

Watson, Rachel (Louisiana Division of Archaeology), Heather McKillop (Louisiana State University) and Brooks Ellwood (Louisiana State University)
[281] *Attractive Salt: What the Magnetic Susceptibility and Stratigraphy of the Witz Naab and Killer Bee Mounds Reveal about Ancient Maya Salt Production and Economy*

Witz Naab and Killer Bee contain some of the last remaining above-ground mounds of a once-thriving salt industry in Punta Ycacos Lagoon, a large salt-water system in Paynes Creek National Park, Belize. Documented sea level rise during the Terminal Classic has submerged the once thriving Classic period (AD 300–900) Maya salt works. Excavations and magnetic susceptibility were conducted as part of the author's dissertation research at Louisiana State University (LSU). This excavation is part of a larger NSF funded project directed by Dr. Heather McKillop (LSU) mapping the wooden architectural remains of the large scale Paynes Creek Salt works. Magnetic Susceptibility samples were collected utilizing a technique developed by Dr. Brooks E. Ellwood (LSU) and processed by the Department of Geology. This paper will discuss the stratigraphy and the results of the magnetic susceptibility in relation to the stratigraphic interpretation. These mounds were once numerous features on the landscape prior to a sea level rise, understanding the stratigraphy of the mounds will aid in interpreting features of the associated submerged salt works and illustrate an increase in the scale of production and aid in the interpretation of the coastal Maya of this regions participated in the broader Maya economy.

Watson-Charles, Carmen**[228]** *Discussant***Watt, David (Tulane University)****[294]** *The Nature of Place: Changing Mortuary Traditions During the Contact Period*

Community and identity among Mississippian communities were centered on cultural landscapes; reified by monumentality and complex political economies, regional interaction, and mortuary traditions. The transition at the end of the Mississippian period is marked by regional collapse, migration, diaspora, and ideological shifts. There is also a reimagining of complex religious and sociopolitical structures, creation of new cultural landscapes, and reconceptualization of collective traditions. Faced with the adversities of a changing and globalizing world, population crisis in the forms of disease and warfare, and forced migrations, latent Mississippian communities were forced to adapt and change to meet these pressures and ensure community cohesion. Changing mortuary traditions of populations at the cusp of political and social change during European contact exemplify how these important socioreligious responses to adversity affect the dynamic political interplay between colonial powers and indigenous populations during the seventeenth and eighteenth centuries. Mounds, cemeteries, and mortuary centers of Lower Mississippi Valley peoples that came under assault were also representative of an attack on that very place, cultural landscapes embedded with memories and histories of particular communities. And in the creation of new mortuary traditions and mortuary spaces, these communities sought to reimagine traditions in new and resilient ways.

Weaver, Brendan (Berea College)**[331]** *Supplies, Status, and Slavery: Contested Aesthetics at the Haciendas of Nasca*

The coastal wine and brandy-producing estates owned by the Society of Jesus in Nasca held captive a large enslaved population in the seventeenth and eighteenth centuries. With a combined population of nearly 600 slaves of diverse sub-Saharan origins, San Joseph and San Xavier de la Nasca were the largest and most profitable of the Jesuit vineyards in the viceroyalty of Peru. These estates were also home to black freepersons and itinerant indigenous and mestizo wage laborers who engaged, exchanged goods, developed intimate relationships, and even married enslaved persons tied to the estates. Enslaved actors made use of goods supplied by their Jesuit administrators along with products that they provisioned themselves, grew in their own gardens and fields, made locally by craft specialists on the estates, or obtained through exchange with free residents and visitors who connected the estates to a broader colonial market. The aesthetic worlds of the estates were contested through the ways in which enslaved actors engaged with each other and their free neighbors, provisioned themselves, and made use of material culture, often strategically manipulating their statuses and making meaning in ways reflective of their diverse origins and entanglements.

[64] *Discussant*

Weaver, Eric [301] see McCrackan, Jennifer

Webb, Paul [160] see Benyshek, Tasha

Weber, Sadie (Harvard University)

[238] *Life on the "Periphery": Pastoralism at Atalla*

Atalla, located in the south-central Andes of Peru in the province of Huancavelica, boasts a monumental temple and expansive, multi-phase domestic areas. Occupation of the site intermittently spans approximately 3,000 years, and human presence in the surrounding area likely predates this site. Recent excavations focusing on both the monumental and domestic sectors of the site have yielded faunal remains from nearly all contexts. Here, I present an analysis of the faunal remains and bone tools from all periods of occupation at Atalla, focusing primarily on the earliest occupations of the site. I integrate zooarchaeological and microbotanical data to explore the emergent pastoral economy in relation to Atalla's potential role as both a distributor of cinnabar and a central locus of interregional exchange.

Weber, Sadie [222] see Mesia, Christian

Weber, Andrzej (University of Alberta/Aix-Marseille University)

[330] *Middle Holocene Hunter-Gatherer Archaeology in the Baikal Region, Siberia: Recent Developments and Future Directions*

Over the last 20 years, the Baikal Archaeology Project has invested much effort and many resources into research on Middle Holocene hunter-gatherers of the Cis-Baikal region in Siberia (~8300–3500 cal BP). Examination of new materials excavated by the project and analysis of previously accumulated archaeological collections produced many new insights on just about every aspect of Baikal's hunter-gatherers. We now have a very good record of spatial and temporal variation in diet, subsistence, mobility and migrations, health, trauma and activity patterns, population size and distribution, mortuary practices and some information on genetic structure. A recent breakthrough is the development of a method for building high-resolution chronologies (HRC) of decadal resolution for the region's Middle Holocene cemeteries. The method is important because it allows examination of the entire body of data from Baikal's hunter-gatherer cemeteries from a fresh chronological perspective. The most important discoveries facilitated by HRC include: identification of dietary trends during the Early Neolithic, identification of a substantial gap in the use of one large Early Neolithic cemetery and substantial revisions to the timing of all Middle Holocene culture historical periods. The paper reviews these discoveries and outlines future work.

[330] *Chair*

Webster, Andrew (University of Maryland)

[207] *Marginality in a Connected World: Consumption and Consumerism in Nineteenth-Century Rural Ireland*

Although, the rural Irish are often characterized as a geographically and economically isolated people, their material culture reveals that in the nineteenth century, they were part of a growing global economy—one that circulated both goods and people around the British Empire and beyond. While the industrial revolution and the spread of capitalism allowed for greater access to a variety of goods for the rural Irish, they also maintained a class system that perpetually confined the rural poor to marginalized positions within society. These men and women negotiated this system through their consumption of material goods to create a sense of self and a cultural identity. This paper uses archaeological and historical data to explore the economic and anthropological processes of trade, exchange, availability, and access at the local, national, and international levels.

Webster, Chris (DIGTECH—APN—PCS—Codifi—@archeowebby) and Tristan Boyle (Archaeology Podcast Network)

[37] *Podcasts as Archaeological Digital Preservation*

Archaeologists are increasingly collecting and storing archaeological data in a digital format. While a lot of time and effort has been spent on the HOW of digital information collection, little time has been spent on the other side—public outreach. An archaeologist's job is only half complete when the digital data are safely stored on multiple servers and in an archival format. If no one knows about it did it ever really matter? Podcasts are typically free and are accessible by everyone with the ability to hear. They are easy to create, store, and disseminate. The Archaeology Podcast Network has gone from a few thousand to over 30,000 monthly subscribers in just over two years—proving that the general public WANTS to know about what we're collecting and storing. Since podcasts are inherently digital, they can be preserved as the audio record of the collected digital information.

[111] *Moderator*

Webster, David (Penn State University)

[71] *Creeping Collapse at Copan*

Over the last decade archaeologists have shifted from dramatic accounts of collapse to more nuanced narratives of decline and disruption, resilience and recovery. This shift partly reflects richer archaeological data, and partly fashion. Although Copan has long been a poster-child for the Classic Maya collapse, the history of research there has long prefigured this shift in archaeological perception and contributed importantly to it.

[41] *Discussant*

Webster, Laurie (University of Arizona) and Edward Jolie (Mercyhurst College)

[373] *Aztec's Textiles, Baskets, and Other Perishable Traditions: Contributions of Recent Perishables Research to a New Understanding of the West Ruin*

Earl Morris recovered more than 1,500 perishable artifacts from the West Ruin of Aztec, but his publications provide only a glimpse of the diversity, richness, and strong research potential of this relatively well-preserved and well-provenienced perishable collection. In this paper, we discuss our recent reanalyses of these assemblages and present new insights related to Chaco-Aztec relations and the organization of ritual practice, society, and craft production at Aztec. We also highlight continuities and discontinuities between the twelfth- and thirteenth-century perishable assemblages to interpret Aztec's changing place in the late prehispanic Pueblo world.

Webster, Laurie [60] see Gearty, Erin

Weed, Jonathan [333] see Klassen, Sarah

Wegter, Bruce [343] see Arnn, Anna

Wei, Dong (Jilin University, Research Centre for Chinese Frontier Archaeology) and Si Yang (Beijing Yuanming Company Ltd.)**[115] *Cranial Trepanations in Bronze Age and Early Iron Age Xinjiang***

Trepanation is defined as the intentional removal of a piece of bone from the cranial vault of a living individual without penetration of the underlying soft tissues. In China, practicing trepanation can be traced back to the Neolithic, and it can still be found today in some populations in other parts of the world. Nine skulls with lesions from four Late Bronze Age and Early Iron Age cemeteries (Yaer from Hami, Goukou from Jinghe, Yanghai from Tulufan, and Choumeigou from Changji) (4000–2000 BP) in Xinjiang were investigated macro- and microscopically. In conjunction with other information obtained through generation of bioarchaeological profiles of these skeletal assemblages, the aim of this study is to contextualize the observed trepanation cases with their archaeological settings and to explore their temporal and spatial distribution and social/cultural implications. Signs of new bone deposition, implying the short or long-term survival of all individuals after the operation, may indicate that during the Late Bronze and Early Iron Ages in Xinjiang trepanation had been a well-practiced procedure, in turn supporting the suggestion of its importance as a therapeutic method in these ancient peoples.

Wei, Dong [72] see Wang, Tingting

Wei, Qiaowei**[213] *Made Locally or Long-Distance Transportation? New Evidence on Ceramic Vessels from Salt Production Sites from the Late Shang Period in North Shandong***

Research on salt production in Ancient China has been examining the function, typology, and chronology of a certain type of ceramic vessel, the kuixingqi (Helmet-shaped vessel). Instead of examining typology of Kuixingqi vessels from salt workshops at North Shandong region, dated to 3000 BC, I began by looking at how those Kuixingqi vessels made and transported into the salt workshops, if those vessels are not made locally. I will present the findings of the ceramic petrographic analysis conducted on Kuixingqi vessels by the low res microscope. This analysis gives us better understanding of how ceramic vessels made for salt workshops, and what was the baseline for salt workshop managed the production process.

Weide, D. Marie (University of Nebraska-Lincoln), Maria C. Bruno (Dickinson College), Christine A. Hastorf (University of California-Berkeley) and Sherilyn Fritz (University of Nebraska-Lincoln)**[95] *"The Decoupling of Environment" and Political Change in the Prehistoric Southern Titicaca Basin***

As the greater project of this symposium attests, we want to become more aware of the constraints of our historical training and try to not separate culture from nature, or politics from the environment in our study of the past. Toward that end, the authors have been working on understanding water and lake level regimes of the southern Titicaca Basin, to better understand the history of this shallow lake and the people that lived around it from the Formative through the Late Horizon. Throughout this prehistoric sequence a large polity, Tiwanaku, developed in this region, clearly engaging with the landscape and waterscape of their valley. Many scholars have linked Tiwanaku's political and economic rise to a rising lake and its fall to a desiccation and lack of lake water. The new lake data presented here clearly demonstrate how the political trajectory of the prehistoric sequence does not parallel the lake's history, thus allowing us to better understand the impact prehistoric societies had on their environments and vice versa.

Weiland, Andrew (Ohio State University), Laura Crawford (Ohio State University) and Bret J. Ruby (Hopewell Culture National Historic Park)**[53] *Fires at Axis Mundi: Macro- and Microbotanical Investigations of a Hopewell Woodhenge***

At Hopewell Mound Group in Ross County Ohio (33RO27), 2013 magnetic gradiometer investigations redefined the long invisible Great Circle, a 120 m diameter woodhenge. The 2016 excavation of one of four central features within the Great Circle revealed a large thermal feature. Although unusually large for this purpose, the arrangement of fire-cracked rock, clay lining, hot-burning hardwoods, and grass seed suggest a classic earth oven common to domestic sites. However, ethnographic analogy indicates that woodhenges, which are ubiquitous in eastern North America during the Middle Woodland period (AD 1–500), were used in axis mundi rituals such as the modern Sundance. In the Hopewell cultural context, there exists a dichotomy between sacred sites swept clean, and domestic debris of habitation sites. Thus, archaeobotanical analysis of an earth oven central to a Hopewellian ritual reveals a mixture of domestic and ceremonial symbolism potentially indicative of feasting. Careful archaeobotanical analysis is central to understanding the formation, function, and meaning of this feature—and Hopewell Mound Group as a whole. In this focused study on one large feature, we use seed and wood charcoal identification in conjunction with phytolith extraction to assess stratigraphy and to detect remains of removed or uncarbonized plant use.

Weiner, Robert (Haffenreffer Museum of Anthropology, Brown University)**[157] *Playing with Fate: A Relational and Sensory Approach to Pilgrimage at Chaco Canyon***

Chaco Canyon is generally understood to have derived its regional influence by virtue of ceremonial power. But what exactly—experientially, sensorially, affectively—was so compelling about the experience of Chacoan ritual, and how might we approach these immaterial dimensions of the archaeological record? In this paper, I suggest that ceremonial gambling/gaming was an important practice during Chacoan gatherings that allowed participants to interact directly with supernatural forces. After briefly discussing multiple lines of evidence for gambling at Chaco, I emphasize the sensory and affective dimensions of games of chance. For example, ethnographic Native American gaming was often accompanied by fervent singing and shouting to distract the opposing team. Furthermore, gambling is primarily an endeavor that deals with The Unknown: with forces known variably as "fate," "divine favor," or "luck" depending on one's worldview. To gamble is to enter a direct and highly-charged relationship with those unseen agents who make dice land heads or tails, who bring plentiful rainfall one year and not the next. I argue that the relationalities experienced by Chacoan gamblers with supernatural forces and with each other—and control over access to such experiences—formed crucial elements of the site's allure and power.

Weiner, Robert [23] see Shepard, Lindsay

Weismantel, Mary (Northwestern University)**[242] *Ontologies of Water: Intensities and Magnitudes***

Increasingly, the effects of global warming take the form of destructive movements of water, whether vanishing bodies of water that create desertification or floods that damage human habitations and take lives. The extensive archaeological record of the North Coast of Peru offers a place to study long-term human strategies for living with the dangerous and unpredictable movement of water. Despite frequent earthquakes, floods and torrential rains that re-shape land- and seascapes, humans flourished on the North Coast, using the region's abundant maritime and riverine resources to construct some of the earliest monumental architecture in the Americas, and later, complex state-level societies such as Chimú. Archaeological theories about the relationship between this rich archaeological record and the region's tempestuous waters have variously included theories of punctuated equilibrium; collapse and rebuilding; or, more recently, long-term sustainability based on strategies of mobility and flexibility. In this paper I look for the underlying indigenous ontologies that allowed humans to flourish despite the destructive yet fertile waters that periodically inundated their homes and fields. From

this perspective, our species appears as the coproducers of a fluid natureculture in which we are neither the controlling masters nor the hapless victims of water.

Weiss, Andrew (University of Pennsylvania) and Vincent C. Pigott (University of Pennsylvania Museum)

[271] *Here We Go Again: A New Series of AMS Dates from the Kkho Wong Prachan Valley, Central Thailand*

A new series of AMS dates from the Khao Wong Prachan Valley (KWPV) in central Thailand addresses several key questions in the region, including the dating of the initial settlement of the valley, the duration of the pre-metal period, the first appearance of copper-base artifacts, the beginning of large-scale crucible-based copper smelting and production at the site of Non Pa Wai, the shift to a different copper production technology used at Nil Kham Haeng, and, the occupation span of the associated habitation site of Non Mak La. Defining the temporal extent of these industrial deposits allow us to estimate the production intensity of copper in the Khao Wong Prachan Valley. The dating program's strategy and results are discussed, along with the implications for the prehistory of Thailand and Southeast Asia, with particular focus on the ties between the KWPV and copper-age sites in the Phimai region in NE Thailand.

Weisskopf, Alison (University College London) and Dorian Q. Fuller (University College London)

[333] *Elusive Wild Foods in Southeast Asian Subsistence: Modern Ethnography and Archaeological Phytoliths*

While grain crops, such as rice, are relatively easy to identify in the archaeobotanical record, evidence for early agriculture in the wet tropics can be elusive. In this region staple foods were not always grain-based and even today wild plants play an important role. So how do we identify ancient food pathways? Unlike temperate parts of the world, charred material rarely preserves, so this is where micro fossils such as phytoliths and starches come into play. I use phytoliths in combination with ethnobotany to evaluate plant remains from archaeological sites in Thailand and Vietnam and identify past arable systems.

Weiss-Krejci, Estella (Austrian Academy of Sciences, Vienna, Austria)

[31] *Osteonarratives in the German-Language Tradition*

This paper will discuss the research history of "osteobiography" in German-language anthropology and archaeology. That the term "Osteobiographie" is actually not in use does not imply that the concept does not exist. Although German-speaking prehistoric anthropologists were and still are predominantly focused on population research, science-based stories relating to individuals have been told, for instance, about Ötzi the Iceman. On closer inspection such narratives reveal a tendency to surface under very particular circumstances: they are either triggered by a particular find context, by specific osteological characteristics or by historic circumstances under which these bodies are discovered. Hence, like all biographies, osteonarratives run the danger of being subject to manipulation in many ways. The paper analyses some of these narratives and discusses current trends and attitudes relating to osteobiographies in the German-speaking archaeological and anthropological research community.

Weiss-Krejci, Estella [83] see Dodge, Robyn

Weitzel, Elic (University of Connecticut) and Daniel Plekhov (Brown University)

[260] *Contact-Period Settlement Changes in Eastern North America: A Test of the Ideal Free and Ideal Despotic Distribution Models*

Archaeological and historic data suggest that prior to European Contact, Eastern North America was heavily populated. However, within a century of Contact, the indigenous population was decimated. To explore one of many behavioral changes brought about by this demographic collapse, we model indigenous settlement in Eastern North America pre- and postcontact as a function of environmental productivity. We hypothesize that if postcontact settlement differed from precontact, two scenarios are possible: settlement changes may conform to an ideal free distribution (IFD) if the average net primary productivity (NPP) of site locations improves postcontact, or an ideal despotic distribution (IDD) if average site NPP declines. Using data from the Canadian Archaeological Radiocarbon Database, we find that overall, the NPP of the average site increases after Contact suggesting settlement according to an IFD at this time. Reductions in population allowed consolidation of people in higher quality habitats. However, geographically weighted regression indicates regional variability in this trend and possibly the opposite pattern, a decline in NPP conforming to an IDD, in some locations of Eastern North America. Therefore, while the overall trend is one of movement toward high-quality locations, Europeans appear to be forcing indigenous peoples into more marginal habitats in certain places.

Welch, John (Simon Fraser University)

[172] *Open Eyes, Open Minds, Open Arms, and Open Hearts Open Archaeology*

Archaeologists share formidable qualities of mind and temperament: observational acuity, organizational skill, perseverance. These are necessary, of course, in the sifting through of vast arrays of questions to address, evidence to harness, methods to deploy, and interpretive lenses to employ. Such rigor-making attributes may not, however, be sufficient for effective practice at hazy contacts among material pasts and intangible presents, for negotiating meanings and values out of that haze, or for investing those meanings and values into projects with non-academic benefits and beneficiaries. Success in such pursuits, including transdisciplinary research and community-driven practice, often requires high tolerance for ambiguity in measures at least equal to precision and consistency. Keeping eyes, minds, and arms open to possibilities for unanticipated ways of seeing, knowing, and collaborating—a discipline dependent as much on relaxation as on rigor—opens archaeology to the benefits of humankind's most potent ally, positive affect.

Welch, John [34] see Tosa, Paul

Weldy, Megan [368] see Mead, Kent

Welker, Frido (Department of Human Evolution, MPI-EVA)

[96] *Ancient Hominin Bone Proteomes: Improving our Understanding of Past Human Behavior through the Study of Ancient Bone Proteins*

The analysis of ancient proteins is increasingly used to study archaeological and anthropological bone specimens from prehistoric time periods. This ranges from large-scale ZooMS screening (Zooarchaeology by Mass Spectrometry) of morphologically unidentifiable specimens to the targeted analysis of ancient bone proteomes from humans through the application of LC-MS/MS. Here, some biological and phylogenetic results that can be obtained through the analysis of ancient human bone proteomes will be discussed in the light of the Châtelperronian, "transitional," technocomplex of western Europe. This technocomplex is chronologically placed between Middle Paleolithic (MP) and Upper Paleolithic (UP) lithic industries and displays behavioral aspects interpreted as intermediate between what is typically seen in the MP and UP. Despite intense research interest, the biological

association of the Châtelperronian to either Neanderthals and/or Anatomically Modern Humans remains much debated. The analysis of a Pleistocene hominin bone proteome associated to the Châtelperronian allowed us to establish the biological affiliation of this specimen, and this will be presented together with biological insights obtained through the analysis of the same bone proteome.

[96] *Chair*

Welker, Martin (Penn State University) and Rebecca Duggan (Parks Canada Agency)

[260] *A Comparison of Dog Shoulder Height in European and Native American Contexts*

Dogs are the only domestic animal to have existed on both sides of the Atlantic Ocean prior to the Columbian Exchange. Historic documents indicate that European colonists to North America brought their own dogs and generally preferred large breeds capable of protecting livestock, hunting, and defending settlements from both predators and Native American raids. As early as 1619 the Virginia Assembly banned colonists from trading European dogs to Native Americans, and these policies were quickly adopted in many colonial legislatures, remaining in effect until the 1700s. We compare morphometric data from a sample of over 200 individuals from sites in Europe and the American colonies dating to between AD 1000–1800, and Native American contexts in Eastern North America spanning the last 6,000 years. Though many indigenous breeds were eventually influenced by admixture, our analysis identifies noticeable differences in dog's average shoulder height, supporting assertions that many breeds introduced by European colonists were significantly larger than local Native American breeds at the time of contact.

Wellman, Hannah (University of Oregon)

[387] *Applied Zooarchaeology and Oregon Coast Sea Otters (Enhydra lutris): Following Up on Lyman 1988*

The sea otter (*Enhydra lutris*) was nearly driven to extinction on the Pacific Coast in the nineteenth century due to intensive commercial hunting and the maritime fur trade. Despite some successful reintroduction efforts in North America, the Oregon sea otter population remains locally extirpated and listed as endangered. One aspect of Lyman's 1988 study examined precontact sea otter teeth from Oregon and found they were similar in size to modern California sea otter teeth, and smaller than modern Alaska sea otter teeth. These geographic groupings were later confirmed by an ancient DNA study. I revisit this hypothesis with substantially larger sample sizes of teeth, as well as new data on humeri and femora. Sea otter tooth width and long bone dimensions vary significantly along a latitudinal cline from California to Alaska. Specific, inter-state comparisons of tooth width and long bone measurements do not support the hypothesis that precontact Oregon sea otters are more similar to those from modern California than they are to those from modern Alaska. These data show that morphometric analyses can be used to answer research questions about species distribution and demography, but with less detail regarding inter-state relationships than originally postulated.

Wells, Joanna (University of Alaska Anchorage), Kathryn Krasinski (Adelphi University), David Yesner (University of Alaska Anchorage) and Fran Seager-Boss (Knik Tribal Council)

[194] *Traditional Dena'ina Land Use at the Cottonwood Creek Village Site, Southcentral Alaska*

The Dena'ina and Ahtna developed a sedentary socioeconomically-stratified lifestyle with material inequality by the time of European contact. The development of permanent villages indicates a shift into a complex society with qeshqas (leaders) who had better food, larger houses, and more wealth. Semisubterranean depressions at Cottonwood Creek, ranging from 802 years cal BP to modern age, are remnants of storage and house pits still present on the landscape. Geochemical testing of sediments has the potential to reveal specific storage pit contents associated with feature shape and size. In conjunction with radiocarbon ages and house style, this poster investigates the development of differences in material wealth as it relates to salmon harvesting.

Wells, Joshua J. (Indiana University South Bend)

[227] *Waist Deep in the Big Data: How the Digital Index of North American Archaeology (DINAA) Implements Ontological and Loosely Coupled Organization around the Construct of the Archaeological Site*

Archaeology's disciplinary engagement with big data is confounded by the variety of information types recorded, variability of data due to differential preservation of materials and theoretical orientations of observers, and complexity of archaeological concepts daring to be caged in explicit digital expressions. The Digital Index of North American Archaeology (DINAA) is a linked open data hub, centered around the theoretically, practically, and interpretively fraught definition of "archaeological site," nevertheless a foundational concept in archaeological science. To develop big data from hundreds of thousands of archaeological site definitions gleaned from numerous incompatible systems of nomenclature and investigative frameworks, DINAA employs strategies of aggregated ontological definitions within DINAA and loose coupling to related informational resources outside it, often achieved via fairly standard intelligence key identifiers (i.e., Smithsonian trinomials and similar). This practice requires explicit and critical consideration of what DINAA's big data elements "mean" in their original contexts as well as what else they might "mean" in combination in DINAA or to external investigators. The intellectual labor is not trivial, but is tractable, and exemplifies a replicable process for engaging other concepts of interest to archaeologists (artifactual categories, stylistic components, cultural horizons, etc.), operationalizing archaeology's complexity in pursuit of big data.

[256] *Moderator*

[195] *Chair*

Wells, Joshua J. [18] see DeMuth, R. Carl

Welton, Lynn (University of Chicago)

[171] *The Pre-Aksumite Period in Eastern Tigray: The Chronology and Stratigraphy of the Site of Mezber*

The current understanding of the Pre-Aksumite period of northern Ethiopia has been heavily influenced by data originating from sites in western Tigray, particularly those in the area of Aksum. The Eastern Tigray Archaeological Project (ETAP), however, has also documented substantial evidence for Pre-Aksumite settlement further to the east, through both survey and excavation. This paper will summarize ETAP's efforts to understand the Pre-Aksumite period in eastern Tigray at the site of Mezber, a small rural center of just under 1 ha in size. Although the site was likely in use as early as 1600 BCE, there are two major Pre-Aksumite periods of construction and occupation at the site, the first dating to between 850–750 BCE, and the second from approximately the sixth–first centuries BCE. There is also evidence of limited post-occupational use of the site around the eighth century CE. By focusing on deep soundings excavated in Areas A and C at Mezber, this paper will examine the long-term history of occupation at the site and the contributions it makes to the understanding of the indigenous development and continuity of social complexity in the Horn of Africa.

Wendrich, Willeke (UCLA)

[70] *The Hidden Costs of Archaeology*

Archaeologists have realized for a long time that in the struggle to fund field work, working on publications and the cost of publishing archaeological results are often not covered. With the increase in digital recording and digital publishing this problem is not solved. On the contrary, it is exacerbated by

a number of additional tasks and responsibilities. These range from a changing publication model, where open access is becoming increasingly important, and journals request payment to make articles freely available to payments to data archives. Added to that are the costs in time, or in paying salary for the many additional hours that need to be spent on data cleaning and the inclusion of proper metadata with the many file types that make up a modern record of an archaeological area. Publishers are experimenting with different models to include data and there is an expectation that these will be made available for free as well. The other type of costs is more virtual: all the work on collecting, cleaning and publishing data should be recognized as research in itself, and this requires an investment in time, energy and reputation from archaeologists who are in the position to do so.

[309] *Discussant*

Wendt, Carl (Cal State University—Fullerton)

[278] *Olmec Households in the Context of Sociopolitical Transformation*

The Olmec are among Mesoamerica's earliest civilizations and as such they provide a good opportunity to investigate household change in the context of developing social inequalities. Over the past few decades archaeologists have gathered household data that show the ways they transformed and remain unchanged during periods of social evolutionary change. Artifact assemblages and subsistence patterns are examined and together provide valuable insights into domestic reorganization and transformation. Comparing how change occurred at different scales and domains shows that social evolutionary transformations vary across different levels of society, which highlights the importance of investigating a range of domains and contexts.

Weniger, Gerd Christian [165] see Bradtmöller, Marcel

Werkheiser, Marion

[206] *Discussant*

Werner, Angelia [40] see Eren, Metin

Werner, Joseph (University of Alberta)

[55] *Multiple Functions for an Assemblage of Middle Stone Age Points: Use-Wear Evidence from Magubike Rockshelter, Tanzania*

Preliminary lithic use-wear evidence from Magubike Rockshelter, Tanzania, suggests a mixed function for an assemblage of Middle Stone Age points, including a possible projectile point role. The development of hafted hunting weapons during the Middle Stone Age is thought to have marked a major juncture in human behavioral evolution. Not only did the emergence of this technology likely have a major impact on the foraging strategies of hunting and gathering populations, many have speculated that the composite nature of these weapon systems reflects an important improvement in the cognitive abilities of contemporaneous Pleistocene hominins. Nonetheless, one of the primary challenges in understanding this process and its significance has been identifying and demonstrating the function of pointed artifacts. In this paper, the author makes use of a newly developed use-wear technique that relies on plotting edge damage distribution using GIS software. This method is combined with a more conventional means of high-velocity impact detection to reconstruct possible tool uses. These results reinforce the notion that pointed artifacts, sometimes assumed to be exclusively projectile points, likely assumed a variety of purposes.

Werness-Rude, Maline (Ventura College) and Kaylee Spencer (University of Wisconsin—River Falls)

[204] *Maya Architecture in the Northern Lowlands*

It has long been recognized that ancient Maya architecture encoded sacred ideologies and replicated primordial landscapes through building forms and structural orientations. Many studies have focused on the architecture of the Southern Maya Lowlands, where rich textual sources exist and where an abundance of archaeological data aids in efforts to understand and interpret the meanings of architectural groups. We seek to augment interpretive frameworks with respect to the Northern Maya Lowlands, rather than just applying already existing models to new material. Indeed, northern built environments cannot be seen as carbon copies of southern ones nor can they be understood simply as late derivations from, and/or modifications of, southern ways of thinking about building. Looking at such constructs thus also has the potential to expand our awareness regional variation and specificity. In this paper, we build upon our work concerning northern architectural spaces by considering site orientations, plaza arrangements and sculptural embellishments. While we will focus on the northeastern, Puuc, region, we include sites from northwestern Yucatán and the north-south 'buffer zone,' which also allows us to revisit and reexamine old, conceptual divisions between the Puuc and adjacent areas in the scholarship.

Wernke, Steven A. (Vanderbilt University)

[75] *Irreducible Reducción: Archaeological Microhistory at Mawchu Llacta, a Planned Colonial Town in Highland Peru*

The Reducción General de Indios (General Resettlement of Indians) in the Viceroyalty of Peru brought about one of the largest mass resettlement programs ever enacted by a colonial power, forcibly displacing some 1.5 million native Andeans to compact towns (reducciones) built around plazas and churches. As a colonial utopic project, the Reducción was to remake the Andean world in the ideal self-image of Spanish civic and religious community. As materialized manifestations in the Andean countryside, reducción towns were deeply compromised and ambivalent in their significance and effects: they attempted to reduce the irreducible complexities of community. This paper presents an overview of findings from extensive excavations in domestic and ritual contexts at a large, unusually well-preserved and textually-documented reducción, Santa Cruz de Tuti (known today as Mawchu Llacta). With an occupation spanning Inka through early republican times, Mawchu Llacta promises to shed light on continuity and change in the domestic and ritual practice over more than three centuries of successive imperial rule. Through an archaeological microhistory approach, interdisciplinary research at Mawchu Llacta explores the tangible and mutual transformation of global and local practice through colonialism and the emergence of modernity.

[75] *Chair*

Wernke, Steven A. [75] see Downey, Jordan

Wesp, Julie K. (American University)

[329] *(Re)integrating Cultures at Cacalchen: Recent Excavations at Two Rural Chapels in Central Yucatán*

The arrival of Europeans to the Americas in the sixteenth century forever changed processes of cultural integration. This paper explores how small Maya communities in Central Yucatán navigated the process of integration of new religious practices and the use of preexisting structures in the landscape. This examination stems from recent excavations of two different rural chapel structures at the site of Cacalchen, located in the greater Yaxuna region between the towns of Yaxcabá and Kancabdzonot. While new permanent structures were created to fulfill the needs of a changing religious practice, spaces were chosen that already had important symbolic meaning to the local population. The remote location of these chapels likely meant that there

was not a permanent European presence at Cacalchen during their use which may have resulted in a disintegration of new cultural practices. This research illustrates how landscape participates in social disintegration, as well as integration, when occupied by two distinct cultures that had previously not been in contact. Cacalchen emerges as a space in a constant process of re-integration that continues well into the present day.

[64] *Discussant*

West, Catherine F. (Boston University)

[144] *Birds of a Feather? Bird Conservation and Archaeology in the Gulf of Alaska*

Gulf of Alaska islands provide habitat for substantial populations of both seabirds and migratory waterfowl, which have been under threat from mammal introductions and landscape degradation for more than 200 years. Bird management drives decisions in this island region and focuses on the eradication of invasive species and restoration of island landscapes to their "natural" state. However, given that people and climate have influenced these landscapes for thousands of years, we ask: how do we determine a baseline for this restoration? Using a combination of zooarchaeological data and contemporary bird observations on Chirikof Island, Alaska, the results of this project provide a historical perspective of changing bird biodiversity that can be used to inform contemporary conservation, landscape reconstruction, and illustrate the challenges of applying long-term archaeological data to contemporary environmental problems.

West, Catherine F. [144] see Huston, Melyssa

West, Frankie (University of Tennessee, Knoxville), Stephen Yerka (University of Tennessee, Knoxville), Joshua J. Wells (Indiana University, South Bend), Eric Kansa (Open Context) and Sarah Whitcher Kansa (Alexandria Archive Institute)

[195] *DNA Linkage: Incorporating North American Ancient DNA Data into DINAA*

Genetic data, especially from ancient samples, is frequently incorporated into modern archaeological analyses. Concurrently, sequence data from genetic/genomic research in the United States is increasingly available through open-source context from the National Center for Biotechnology Information (NCBI). However, in spite of the accessibility of recently published genetic data, there currently is no comprehensive database exclusively for North American ancient DNA samples, nor is there comprehensive archaeological data associated with NCBI data. Here, we pilot the integration of published North American ancient DNA sequence data from NCBI into the Digital Index of North American Archaeology (DINAA). By building links from ancient DNA sequences in NCBI to site-based information in DINAA, we incorporate data from a variety of archaeological sources. In addition to creating a useful resource for molecular anthropologists to access information on North American ancient DNA samples, the integration of DNA data into the DINAA toolbox provides a more comprehensive view of archaeological site data in an Open-source context, facilitating the sharing, exchange, and publication of archaeological information.

Westphal, Hildegard [223] see Müller, Peter

Weyrich, Laura (University of Adelaide)

[143] *Alterations in South American Oral Health through the Colonial Period: The Story of Ancient DNA Trapped within Dental Calculus*

Interpreting the evolutionary history of bacterial communities within the human body (microbiota) is key to understanding the origin of many modern diseases. The link between humans and their microbiota can also be exploited to examine and track the extent and severity of human adaptation to the environment and impacts on health. Here, we utilize a shotgun sequencing approach to examine ancient DNA preserved within dental calculus from a wide range of ancient South Americans (n = 162). Well-preserved specimens revealed remarkable microbial diversity in South Americans prior to European arrival. In fact, nearly all observed South American oral microbial diversity fell outside of known ancient and modern European diversity. The patterns observed within microbiota reflected human mitochondrial DNA distribution, and reflected cultural continuity, rather than human replacement, in several locations, similar to the mitochondrial DNA from the same individuals. We also identified unique oral microbial taxa present within South Americans, and can track changes within these species as Europeans arrive, with the potential downstream health-impacts. Consequently, ancient oral microbiota provides a wealth of cultural and anthropological information about the past, which is critical to identify events that altered human health and history.

[143] *Chair*

Weyrich, Laura [143] see Harkins, Kelly

Wharton, Robin [18] see Glover, Jeffrey B.

Wheelbarger, Linda (San Juan College)

[104] *Point Pueblo, a Great House Community in the Middle San Juan*

San Juan College field school excavations at Point Pueblo in Farmington, New Mexico, have revealed a great house with attached great kiva constructed of both local vernacular and stylized Chacoan Type II architecture. Extensive early southern influence, AD 850–1050, is based on the dominant presence of Red Mesa Black-on white pottery. The great kiva floors demonstrate a continuous ritual placement of artifacts subsequent to a major ritual remodeling event of the floor and roof support piers, apparently completed in the late AD 1100s. A large pit containing over 600 sherds present at the southern edge of the great kiva interior may have been used for communal offerings. A new type of great kiva floor feature was discovered on the remodeled floor wherein a horizontal arch of cobbles set in clay was constructed extending out from the northern and southern ends of the remodeled eastern Chacoan roof support piers. Numerous small to medium pit features were constructed on the remodeled floor and then capped before use of the great kiva continued through to the end of the AD 1200s. Point Pueblo exemplifies ritual complexity of the Middle San Juan region during the Chacoan time period.

Wheeler, Arlene

[228] *Discussant*

Wheeler, Jessica [329] see Stanton, Travis

Whelan, Carly (California State University, Chico)**[381]** *The Viability of Long-Distance Acorn Transport in Eastern California*

The ethnographically documented Mono Lake Paiute of Eastern California regularly crossed the Sierra Nevada to procure acorns from Yosemite Valley; a total journey of fourteen days. It is not clear whether such trips are economically efficient in their own right, or were undertaken as components of social excursions to visit and trade with the Yosemite Me-Wuk, or as journeys of necessity in years with poor piñon pine nut harvests. To evaluate the economic productivity of procuring acorns from Yosemite, relative to collecting resources in the Mono Basin, we use previously published data to calculate the mean return rates for collecting and transporting basket loads of various staple foods to a winter camp location. We also calculate the standard deviation of each return rate, taking into account the variance present in published estimates of the caloric content of resources, collection and processing times, packing density, and basket volume. The results indicate that while acorn procurement trips to Yosemite are less productive than collecting piñon pine nuts and Pandora moth caterpillars in the vicinity of Mono Lake, they compare favorably to collecting small seeds. This suggests that long-distance acorn transport was a viable subsistence strategy for the hunter-gatherers of Mono Lake.

Whisenhunt, Mary (University of Texas at San Antonio)**[303]** *Survey in the York-Duncan Valley, Arizona: Understanding Patterns of Mogollon Population Aggregation and Dispersal*

This research project examines prehistoric population aggregation and abandonment processes by analyzing how communities in Arizona's York-Duncan Valley nucleated, and then dispersed in or abandoned the region from the end of the Early Agricultural period to the Salado period. The Upper Gila River Valley offers a unique opportunity to understand these dynamics. The research explores the interplay of ecological and demographic pressures within a resilience theoretical framework. I suggest that community aggregation initially offered competitive advantages which enhanced social robustness, but eventually introduced social and ecological vulnerabilities. This hypothesis will be evaluated, in part, by the survey and recording of sites in the understudied York-Duncan Valley. Survey will focus on agriculturally productive locales most likely to have hosted prehistoric groups, based in part on results from two Geospatial Information System predictive models for prehistoric habitation in the York-Duncan Valley. Variables include a variety of ecological factors and settlement patterns from Early Agricultural to late prehistoric periods in the Mimbres, northern Rio Grande, and Upper Gila River Valleys. Model outputs are then compared to known prehistoric sites in the study area in order to evaluate the methodology.

Whisenhunt, Mary [303] see Corl, Kristin

Whitaker, Adrian (Far Western Anthropological Research Group, Inc.)**[383]** *Social Boundaries and the Cultural Ecology of Artiodactyl Hunting in Prehistoric Central California*

We use a model developed using Geographical Information Systems software to examine the extent to which the suitability of habitat surrounding archaeological sites in Central California affected hunting decisions for three artiodactyl taxa: elk (*Cervus elaphus*), deer (*Odocoileus hemionus*), and pronghorn (*Antilocapra americana*). Model findings are compared to a database of 100 archaeofaunal assemblages from the same area. We find that the model predicts the presence and relative abundance of elk fairly well but underestimates these same measures for deer and overestimates them for pronghorn. Two causes of the disagreement between model predications and data are offered. We reject resource depression of pronghorn or elk as the cause of greater-than-expected deer hunting as there is no decline in relative abundances of either through time. However, we find that the herding behavior of pronghorn and elk, coupled with social circumscription of hunters during the Late Holocene, may have limited hunting opportunities for elk and pronghorn, leading to the ubiquity and abundance of deer bone observed in the record. The increased importance of deer as opposed to elk and pronghorn hunting is attributed to the establishment of territoriality in the region during the Late Holocene.

[383] *Chair*

Whitaker, Adrian [381] see Byrd, Brian

White, AJ (California State University Long Beach), Lora Stevens (California State University Long Beach) and Varenka Lorenzi (California State University Long Beach)**[354]** *A 1,000-Year Record of Cahokia Region Population Change through Fecal Stanol Biomarker Analysis*

Determining the timing and magnitude of Cahokia's demographic rise and fall is crucial to understanding the reasons for its advance and collapse. Fecal stanol biomarker analysis is an emergent geoarchaeological method that may provide a more direct record of Cahokia region population change than previous population estimates. This study analyzed sediment from Horseshoe Lake, Illinois, for fecal stanol content to establish a population proxy of the Cahokia region. The stanol record indicates Cahokia region population increased during the Terminal Late Woodland (AD 900–1050), declined during the Stirling phase (AD 1100–1200) and continued to approximately AD 1400, confirming previous population estimates. The study is the first to provide continuous demographic information from Cahokia's founding to the historic period. The results of this study suggest biochemical indicators may be used alongside traditional archaeological data to evaluate past demographic events.

White, Chantel (University of Pennsylvania)**[27]** *Naomi F. Miller and Applied Paleoethnobotany of Southwest Asia*

Naomi F. Miller's work exemplifies the paleoethnobotanical approach toward understanding human interactions with botanical landscapes in the past using archaeological remains, rooted in theoretical traditions of American anthropological archaeology. On the occasion of her Fryxell Award in Interdisciplinary Research from the SAA, we reflect on her body of published research and active fieldwork to draw out five themes that highlight areas in which Miller has made significant contributions to the field. These include 1) interpretation of archaeobotanical deposits (best exemplified by her insights into the use of animal dung as fuel); 2) quantitative methods for archaeobotanical data analysis; 3) regional synthesis of archaeobotanical datasets to reconstruct environmental and agricultural change through time; 4) integration of botanical datasets with textual and iconographic evidence for plant use, as well as parallel lines of archaeological inquiry (e.g., faunal analysis); and 5) the conservation of archaeological sites via modern plant management strategies. We emphasize the influence of Miller's work on the next generation of scholars in paleoethnobotany, both within and beyond Southwest Asia.

[27] *Chair*

White, Devin [130] see Dungan, Katherine

White, J. Alyssa (University of Oxford), Rick J. Schulting (Institute of Archaeology, University of Oxford), Peter Hommel (Institute of Archaeology, University of Oxford), Vyacheslav Moiseyev (Peter the Great Museum of Anthropology and Ethnogr) and Valeriy I. Khartanovich (Peter the Great Museum of Anthropology and Ethnogr)

[330] Stable Isotopic and Radiocarbon Analysis of Neolithic and Bronze Age Fisher-Hunter-Gatherers from Lake Baikal's Little Sea, Upper Lena River, and Selenga River Regions

The diet of prehistoric hunter-gatherers in the Lake Baikal Region has been extensively studied using stable carbon and nitrogen isotopic analyses. This paper extends this work, reporting new carbon and nitrogen stable isotope and AMS radiocarbon dating results from the cemeteries of Verkholsensk (n = 45) in the Upper Lena micro-region; Ulan-Khada II-V (n = 19) in the Little Sea micro-region; and Fofanovo (n = 22) in the Selenga micro-region. The latter analyses represent the first stable isotopic data from the eastern side of Lake Baikal. Our results revealed several interesting patterns: Late Neolithic and Early Bronze Age individuals at Verkholsensk were significantly different from each other in $\delta^{15}\text{N}$ (n = 41, df = 39, p = 0.000), suggesting a more terrestrial diet in the latter. Children to young adults differed significantly from mid to old adults at Ulan-Khada in $\delta^{15}\text{N}$ (n = 12, df = 10, p = 0.009), the latter showing depleted ^{15}N values. The results from Fofanovo appear isotopically distinct from the other micro-regions as a result of heavy reliance on the Selenga River's resources. At Fofanovo in particular, there were discrepancies between the radiocarbon results and expected archaeological datings. In the future, it will be necessary to establish appropriate freshwater reservoir corrections for sites along the Selenga.

White, Joyce (University of Pennsylvania Museum) and Elizabeth Hamilton (University of Pennsylvania)

[271] Applying a Life History Framework to Analyzing Metal Age Metal Assemblages from Thailand

Application of archaeometric techniques to metals and related evidence from prehistoric sites in Southeast Asia is in its infancy. One result is that sample sizes per site have in most cases been minute or even unspecified, although in rare instances, such as Ban Chiang, sample sizes for metallographic and elemental analyses have been more robust and representative. Small sample sizes obscure key evidence for intrasite and regional variability in technological and economic systems. Recent lead isotope analyses of copper-base artifacts from Thailand and Laos illustrate the potential for fine-grained study of metals assemblages, revealing that different sites had separate supply networks for copper at different periods of time. If our field is to contribute meaningfully toward the study of material culture in past economies and the reconstruction of technological systems in terms of chaînes opératoires, the field must raise the bar in terms of many sampling issues. Not only are larger samples required for plausible reconstructions, but complete assemblages must be assessed, not just a handful of idiosyncratically selected intact artifacts from single context types (usually graves).

White, Kirrily (University of Sydney)

[20] Large, Dispersed, Occupation Aggregates in Prehistory: A Global Comparative Analysis

There is no agreement as to how very large, dispersed, occupation aggregates in prehistory such as the Trypillia megasites (fourth millennium BCE), Chaco Canyon (ninth–twelfth centuries CE) and the sprawling Neolithic settlements of the Middle Yangzi (third millennium BCE) should be classified in archaeology. Often these sites behaved very differently to the large, higher-density settlements with which they are sometimes compared. The aim of this research is to look at material and spatial patterns in the formation, development and demise of these dispersed, occupation aggregate sites on a global comparative scale to understand how they fit into broad patterns of human settlement behavior in the past. By contextualizing changing occupation patterns over time in regional technological development, it becomes apparent that within this form of settlement there is very little change in local spatial and material operation when compared to their smaller predecessors and contemporaries. Comparing these patterns and technologies globally, it is possible to hypothesize that human groups used low occupation density and, in part at least, mobility within long-standing regional and supra-regional traditions of building and trade as the most common ways of managing population increase and the most extensive occupation aggregates their regions had ever seen.

[76] Chair

White, Nancy (University of South Florida)

[393] Long-Distance Connections across the Southeastern United States and Mesoamerica

Despite over a century of research, unquestionable evidence of routine and sustained interaction/communication between the U.S. Southeast and Mesoamerica remains elusive. Similarities in iconography and ritual are very general, possibly ancient. Mexican obsidian and tropical plants occur rarely and only at the outskirts of the Southeast, while earthen mounds and some Mississippian-like artifacts occur on the northern Mexican Gulf Coast. The most glaring (absence of) evidence is the lack of products such as cotton and especially alcohol in the Southeast. Both environmental and cultural processes must account for what was sporadic and limited interaction.

Whitehead, William (SWCA Environmental Consultants)

[287] Recent Work in Southeast New Mexico by SWCA: The Impact of TRU Analysis on How We Define Site Boundaries

SWCA has performed seven data recovery projects in southeast New Mexico between 2015 and 2016 with TRU (Transect Recording Unit) surface survey, collections and analysis. Notable sites have included an archaic pit house structure, a bedrock mortar site and several coppice and parabolic dune sites. A summary of the excavation work will be presented, focusing on highlights from three of these sites. The results of TRU surface collection and analysis will be presented in conjunction with excavation data at six of these sites. We find that TRU surface survey and collection gives much better spatial definition for drawing site boundaries, defining activity areas, and excavation area selection. However in southeast New Mexico, with the majority of sites under some form of sand sheet, TRU analysis alone will not give perfect reconnaissance of subsurface feature areas. We propose that mechanical scraping, shovel tests, trenching and TRU surface analysis is the best way to understand surface to sub-surface site patterning. Recommendations for using TRU surface survey in relation to several New Mexico agency site definitions and reporting criteria will also be presented.

Whiteley, Peter [130] see Watson, Adam

Whitesides, Kevin (University of California Santa Barbara)

[212] The Highest Common Factor: Heterodox Archaeology and the Perennialist Milieu

Introducing a 1944 translation of the Bhagavad Gita, Aldous Huxley concisely described what he called the Perennial Philosophy. Despite the apparently distinct cultures of the world, he said, "beneath the confusion of tongues and myths, of local histories and particularist doctrines, there remains a Highest Common Factor." This perception of an underlying unity among the "higher religions" of the world has led Perennialists to feel a greater sense of ownership and hence freedom in interpreting the significance of major archaeological sites the world over. Unlike alternative archaeological narratives that focus on particular geographical and cultural identities, Perennialism opens the doors to all cultures and all times, though there is a strong tendency toward reverence for the past (or contemporary "shamanic" cultures deemed to model the past). This Perennialist stance undergirds much of contemporary alternative spirituality and, although it claims a timeless authority it is, itself, a temporally located and particularist set of religious positions that can be historically and socioculturally contextualized. It is, in fact, the broader "cultic milieu" in which all of these heterodox themes circulate that can allow us to make sense of the cognitive and social contexts in which the impulses to create alternative archaeological narratives arise.

Whitley, David (ASM Affiliates, Inc.)

[28] Agency, Structure, and the Neoliberal Turn

Recent theoretical over-emphasis on human agency and denial of the significance of sociocultural structure presents a radical challenge to a century of research. It implies that Durkheim, Boas, Weber, etc., are irrelevant, and that long-standing structures of inequality (e.g., of gender or race) somehow do not exist or are not important. Examination of recent human-agency studies illustrates that, instead of studying human agency as action, interpretations are based on the kinds of structures whose existence is denied, meanwhile neither addressing nor resolving the analytical problems raised by this approach originally identified by Giddens, nor accommodating our current understanding of human cognition, including embodiment. Worse, the assumptions about human life mirror those promoted by neoliberal political-economic theory, introduced by Reagan and Thatcher, which portrays any kind of governmental (i.e., structural) control as necessarily deleterious, in favor of the supremacy of near-uncontrolled individual rights. This demonstrates that noncritical archaeology theory can have pernicious even if unintended consequences, in this case supporting the neoconservative ideology that has become the worldview of the West. Natural models, as durable analogical and metaphorical sources for belief and symbolic systems, are argued to be useful sources for archaeological research on religion.

Whitley, Tamara (Bureau of Land Management)**[300] Tribal Collaboration in Heritage Management on the Carrizo Plain National Monument**

The Carrizo Plain National Monument (CPNM) contains some of the most significant Native American heritage sites in the United States. In recognition of this, a cultural landscape, which includes habitation sites, camps, quarries and pictograph sites, has been designated as the Carrizo Plain Archaeological District National Historic Landmark. In addition to these physical features, the Carrizo Plain is imbued with intangible values that embody a sacred landscape for affiliated tribes. The Bureau of Land Management has worked closely with tribal partners during the development of management plans for the CPNM. This has included an adaptive management strategy for public visitation of Painted Rock, a sacred pictograph site. This poster will provide information on how site management at Painted Rock has been guided by this collaborative process.

Whitley, Thomas (Sonoma State University)**[186] Droning on a Budget: UAVs, Aerial Imagery, and Photogrammetry for the Archaeologist**

Recent changes to the FAA regulations covering the use of Unmanned Aerial Vehicles (UAVs) or "drones" have clarified their use in both research and commercial operations. This paper is intended to provide an overview of low-cost entry into the use of UAVs for archaeological projects and considerations for applications in aerial imagery, videography, and photogrammetry. Using drones for documentation and interpretation is no longer uncommon, but it has been cost-prohibitive since the previous regulations required full pilot licensing or were ambiguous. By gaining a little bit of knowledge and experience, now even graduate students with little funding can find opportunities to employ these devices on their own research projects. Some examples will be provided along with a discussion of what the future holds for UAV technology.

Whitlock, Bethany and Kari Lentz (Sonoma State University)**[75] A Rectory Divided: Mediation of Space in a Colonial Town in the Southern Peruvian Highlands**

During the sixteenth century Viceroy Toledo ordered a series of reforms in the Viceroyalty of Peru that involved the forced resettlement of the native population into planned nucleated settlements (reducciones). Toledo believed that these standardized built environments, in conjunction with ecclesiastical regulation, would produce idealized colonial communities. This paper presents the initial results of recent excavations in the rectory at Mawchu Lacta, a reducción in the Colca Valley. The rectory served as the dwelling for the parish's clergymen during its three centuries of occupation. The interior organization of the rectory was distinct from that of other domestic structures in the settlement, and underwent significant modification during its occupation. One room, for example, was divided into clear public/reception and private spaces. As such, we focus on temporal changes in the structure and organization of the rectory, including the reuse of Inka architectural elements. We also consider historical documents pertaining to the rectory, and examine the differences between these and the archaeological evidence. Ultimately, we explore how priests, agents of colonial authority, mediated power through control of space. We also intend to investigate how the lived experiences of indigenous Andeans and colonists, such as clerics, differed during the colonial period.

Whitney, Kristina (University of New Mexico)**[346] Landscape Use in Southeastern Ethiopia**

The widespread availability of satellite data has opened up parts of the world that have long been inaccessible for archaeological research. One such area is the border between Ethiopia and Somalia, which has been embroiled in civil conflicts for the past 30 years. As such, little is known about the cultural heritage of southeastern Ethiopia and the greater Somalia region. This project shows how using geographic information systems (GIS) as a form of initial survey can reveal substantial results while minimizing personal risk to the researcher and maintaining cost effectiveness. The research goal was to understand how modern villages and surface anomalies relate to each other and to the landscape through analyzing satellite imagery at a scale of 1.19 m per pixel. Topographic features, such as drainages and landscape position, were analyzed in relation to identified villages and surface anomalies to analyze continuity in landscape patterning. This information was then used to estimate the length of time these anomalies may have been present on the landscape with three models. Even though ethnographic data are sparse, I conclude that longer estimates of habitation by pastoral groups in southeastern Ethiopia fit with the known data.

Whitridge, Peter (Memorial University of Newfoundland)**[35] Manufacturing Reality: Inuit Harvesting Depictions and the Domestication of Human-Animal Relations**

Schematic harvesting scenes incised on tools are a stock variety of both precontact and historic Inuit graphic art. They sometimes seem to depict historically specific events, which they effectively commemorate, and have real (sometimes precise) informational content that must have been important for the dissemination of technical harvesting knowledge among a hunter's peers, and its inter-generational transfer. However, the harvesting setups—such as a boatload of hunters on the verge of harpooning a whale—are rather conventional, even repetitive, suggesting that these depictions also acted to discursively stabilize particular sorts of relations among people, things, the environment, and nonhuman animals. This may have been an intended function, along the lines of a hunting amulet, or it may have been an unconscious effect achieved through the eidetic citation of an idealized turn of events. Although scenes of harvesting walrus, caribou, birds, fish and other species occur in this idiom, bowhead whaling was clearly the object of a special fascination. Whaling scenes are the most conventional of all, condensing these various functions—historical, educational, symbolic—as they engaged whales in a discourse on human-animal relations that embraced ritual, belief, memory, social relations, technology and economy.

[35] Chair**Whittaker, John (Grinnell College), Daniel Lee (Grinnell College), Lee Sharpe (Grinnell College) and Jeffrey R. Ferguson (University of Missouri)****[88] Sources of Sinagua Obsidian Points and Debitage: XRF Analysis**

Projectile points and debitage from three Sinagua sites in northern Arizona were analyzed using the XRF instruments at Missouri University Research Reactor. The rooms at Lizard Man Village, Fortress Hills, and New Caves were occupied between AD 1050 and 1250. Over 300 obsidian points and debitage were analyzed using an ARL Quant'x EDXRF Spectrometer. The primary source of obsidian is the well-known Government Mt source, with a few samples from RS Hill and other sources. The nearest sources of abundant obsidian were heavily used, but our data allow us to look at changes through time in northern Sinagua obsidian use and point typology.

Whitten, Ashley (University of Kentucky) and David Chicoine (Louisiana State University)

[231] *Architecture and Spatial Organization of Urban Cercaduras at the Early Horizon Center of Caylán, Nepeña Valley, Peru*

This poster presents architectural and spatial data from monumental urban compounds or cercaduras at the Early Horizon center of Caylán (800–1 BC), Nepeña Valley, Department of Ancash, Peru. Caylán is interpreted as the primary center of a multi-tiered polity that developed in the littoral portion of the Nepeña Valley and reached its peak during the second half of the first millennium BC. Recent fieldwork at Caylán revealed the existence of more than 40 cercaduras interpreted as multifunctional residential compounds. The cercaduras are articulated through more than a dozen streets. Area excavations and systematic pedestrian surveys provide significant data to explore the organization of the cercaduras including their size, complexity, depth, and overall variability. Results indicate that the urban cercaduras share spatial logic, in particular with respect to their access patterns and sub-divisions. Here, we analyze architectural data from a spatial syntax perspective with the objective of reconstructing the size and complexity of the co-residential groups at Caylán. We present detailed reconstructions of six of the better preserved cercaduras to bring insights into Early Horizon urban landscapes and demographics. The results are discussed in light of the increased complexity and potential socioeconomic diversity of human settlements in coastal Ancash during the Early Horizon.

Whitten, Ashley [320] see Pool, Christopher A.

Wholey, Heather (West Chester University)

[216] *The Mid-Atlantic Steatite Belt: Archaeological Approaches to Traditional Knowledge and the formation of Persistent Landscapes*

In the Mid-Atlantic, steatite outcrops within the eastern talc belt, which runs from Alabama, through New England to Labrador. It is a porous, carvable stone with a mineralogical and chemical makeup that inhibits soil formation, resulting in scrub or barren landscapes that host rare grasses and wildflowers. In their natural state, these would be striking landscape features. While an array of items, such as plummets, bannerstones and pipes, were produced from steatite throughout precolonial times, the craft of carving open vessels peaked during the Transitional Period. Though several locales may supply steatite, only some appear to have been used for extraction, and finished vessels are found up to 300 km from these source locations. Traditional knowledge about the environment is often observable to us through ethnography, local toponymy, or oral history. Much of the Mid-Atlantic region lacks access to these rich sources. Yet traditional knowledge is also manifest in the physical construction of persistent landscapes as people visit and revisit places, infusing them with meaning and memory. This work addresses how archaeology helps to understand how people developed traditional knowledge of resources in the past, and how archaeology may be a partner in the contemporary cultural reimagination of relict landscapes.

Wholey, Heather [224] see Nash, Carole

Whyte, Thomas

[160] *Big Meat Feasting in the Pisgah Phase of Western North Carolina.*

Animal remains from three late prehistoric Pisgah phase sites in mountainous western North Carolina are described and compared. The sites include a mound (Garden Creek Mound No.1) and adjacent village, and a village with no mound (the Cane River Middle School site). Deer, black bear, turkey, and box turtle remains dominate all three assemblages. Three large bones from the mound, previously reported as bones of Bison, are definitively Elk. Whole large mammal bones, recovered almost exclusively from the mound, are interpreted as evidence of lavish feasting. In contrast to Mississippian faunal assemblages from the adjacent lowlands, evidence for food resource competition or scarcity is lacking in the central Appalachian Summit highlands.

Whyte, Thomas [385] see Lapham, Heather

Wichlacz, Caitlin (Arizona State University) and David Abbott (Arizona State University)

[335] *Testing Alternative Settlement Models at Las Colinas with Polychrome Dating*

An understanding of the nature of late Classic period settlement at Las Colinas is an important element in understanding the broader social changes that took place across the Phoenix Basin during this time. One perspective on settlement at Las Colinas figures prominently in the recent "core decay" model proposed for the Phoenix Basin Hohokam. In response to this model, we propose new alternative scenarios for late Classic period settlement at Las Colinas. We test these alternative settlement models through an examination of ceramic data, principally from the polychrome pottery that appears in the Phoenix Basin during the late Classic period as a sign and signature of new social arrangements. Finally, we discuss the implications of our study for broader understandings of social change and settlement dynamics in late Hohokam prehistory.

Wickeret, Andrew [48] see Monteleone, Kelly

Wickler, Stephen (Tromsø University Museum)

[32] *Northern Norway's Sea of Islands: Processes of Maritime Colonization and Settlement*

Epeli Hau'ofa's (1993) perception of Oceania as a "sea of islands" is a useful point of departure for exploring the long-term trajectories of the many thousands of islands scattered along the coast of northwestern Norway. Hau'ofa's vision of joined islands is also instructive as a way of emphasizing seaborne connectivity rather than insularity within maritime archaeology. This paper highlights problems related to island colonization and settlement since the Early Mesolithic (11,500–10,000 BP) in northern Norway with potential relevance for island archaeology at a global scale. A central problem is the necessity of documenting island landscape transformations as a prerequisite for understanding human-island interaction in a region where prehistoric shorelines may be currently submerged or elevated. A second problem related to island colonization is the pervasive underestimation of nautical expertise and sophistication of seagoing vessels prior to the Bronze Age in the archaeological literature. Evidence for island settlement among the indigenous coastal Sami is reviewed and the consequences of medieval Norse fishing settlement colonization of islands in Sami areas evaluated as a means of exploring the nature of colonization as a layered process.

Widmer, Randolph (University of Houston) and Rebecca Storey (University of Houston)**[80]** *Teotihuacán at Night: Lighting a Prehispanic City*

Teotihuacán was a large and populous city at its height with an estimated population of 100,000 people. Since it lies in an arid landscape with neither domesticated animals as a source of dung for fuel nor oils from tree seeds these fuel sources could not have been used for cooking, lighting and to a lesser degree heating. Only wood from trees and shrubs and other plant materials could have been used for fuel. These have been identified in charcoal from archaeological deposits at Teotihuacán, indicating their possible use in lighting. Certain artifact types, such as candelaros, tapa platos, braziers, and censers, used for cooking and ritual also provide light. The demand for fuel from trees and shrubs would have been high, so these resources would have been managed and their distribution and consumption highly organized. We argue that Teotihuacán was a relatively dark and quiet city at night, and only those citizens and compounds that were wealthy enjoyed light from external fuel sources at night. We further suggest that Teotihuacanos took advantage of light derived from ceremonies, rituals, and cooking and therefore performed these activities at night when light was required rather than in the day when light wasn't needed.

Wiebe, Matthea (Simon Fraser University), Peter Wallace (McMaster University) and Francesco Berna (Simon Fraser University)**[354]** *Soil Micromorphology Analysis of Area D at Manot Cave, Israel: Insights into Site Formation Processes*

Manot Cave, discovered in 2008 in Western Galilee (Israel), represents one of the richest Upper Paleolithic assemblages in the Levant. The site has produced a ca. 55,000-year-old anatomically modern human calvarium, as well as Middle Paleolithic to Post-Aurignacian lithic and bone artifacts. The deepest stratigraphic sequence is found in Area D, located halfway down the steep talus. This area shows continuous stratification from dolomite bedrock to an early sterile colluvium, an archaeological colluvium, and a late sterile colluvium. The aim of this work is to characterize the different stratigraphic units by soil micromorphology in order to determine their origin and correlate them to stratigraphy in the cave's other excavation areas. Components such as relative sizes of sand particles, microstructure, coprolite fragments, and chert gravel are utilized in our analysis. In particular we found that the early sterile colluvium is dominated by fine quartz sand, the archaeological colluvium by medium quartz sand, and the late sterile colluvium by very fine quartz sand. The very fine quartz sand dominating this late colluvium is also typical of the modern terra rossa soil. The implications of these finds for site formation and use of space will be discussed.

Wieckowski, Wieslaw C. (University of Warsaw)**[316]** *Bioarchaeological Research at Castillo de Huarmey, Peru*

The Wari imperial mausoleum, discovered in 2012–2013 at the site of Castillo de Huarmey, Peru, brought to light remains of 64 individuals buried within the main chamber underneath and additional seven in the contexts directly associated with the mausoleum. The upper layers of the building also yielded a collection of human and animal remains. The collection of human remains brings a unique set of data for bioarchaeologists. The research performed so far include standard analyses like taphonomy, demography and health status, along with biogeochemical ones. Stable isotope analyses of strontium, oxygen, nitrogen and carbon provided insights into the geographical origins and potential mobility as well as dietary preferences of the individuals buried within that unique context. Preliminary DNA analysis widened the scope of information obtained. A lot more of analyses have to be performed to fully understand the character of the Wari presence on the north coast of Peru.

[316] *Chair***Wiederick, Brock (Amec Foster Wheeler) and Fernando J. Astudillo (Simon Fraser University)****[220]** *Industrial Islands: Ecological Impacts of the Steam-Powered Mills of the El Progreso Plantation, Galápagos Islands*

From 1880 to 1917 "El Progreso" plantation operated on the humid highlands of San Cristóbal Island in the Galápagos archipelago (Ecuador). The plantation enterprise used steam-powered machinery for sugar refining and alcohol distillation. Despite its remote location, 1,000 km west from the South American coast, this large operation took advantage of the latest industrial technology. A number of specialized machines were used in sugar processing which were imported from factories in Scotland and the United States. The implementation of the industrial machinery required large quantities of wood for fuel, permanent sources of water, and the construction of large buildings. After the murder of the plantation owner at the hands of his workers in 1904, the machinery and the mill operated for another decade before being abandoned. Parts of the machinery were removed to mainland Ecuador but some have remained on site. This paper explores the characteristics of the technology used during the industrialization of El Progreso plantation and its effects on the local ecology of San Cristóbal Island.

Wiegand, Jane**[90]** *An Attempt at Digitally Associating Skeletal Elements: A Study of Photogrammetry and Articular Surface Area*

When excavating archaeological skeletal remains it is not uncommon to find them disarticulated and even commingled with other sets of remains. To study these remains it is paramount to first accurately and efficiently re-associate all skeletal elements. Re-association of skeletal remains is necessary before any other form of analysis (ancestry, sex, age, stature etc.) can be performed. While analog methods have been previously applied to standardize this task the advent of digital modeling provides a new medium within which new methodologies may exist. For example, photogrammetry is an accessible means of digitization with the potential to aid in shape analysis. This study used photogrammetry to answer two questions: is photogrammetry a practical means for digitizing skeletal remains? And, is articular surface area a measurement that can be used for re-associating skeletal elements? During the study photogrammetry was found to be a practical means with which 3D models could be rendered in part due to the basic and relatively affordable tools available, even in consideration of time and learning curve. In contrast, articular surface area would require further research to demonstrate its practicality, or lack thereof, for being a means by which disarticulated skeletal remains could be re-associated.

Wigati, Sri [180] see Ono, Rintaro

Wigen, Rebecca J. [46] see Stewart, Kathryn

Wigodner, Alena (University of Arizona)**[234]** *Being a Woman in Roman Gaul: Gendered Votive Offerings in a Colonial Context*

The annexation of Gaul into the Roman Empire in the mid-first century BCE spurred the development of new religious practices in that region, including the practice of offering votive figurines at sanctuaries. Because each votive represents a personal decision on the part of the dedicant, analysis of votive assemblages provides unique insight into the demographics of worshippers and illuminates aspects of individual identity in this colonial context. Here, I present the results of a quantitative analysis of gendered votives, most notably female anatomical figurines—a votive type that existed neither in Gaul nor in Rome at the time of Roman conquest. Analysis of the geographic spread of the practice of offering gendered votives as well as of the differences between male- and female- gendered votives, especially when compared with the much more Roman practice of offering written dedications, provides a

means through which to study Roman colonialism as a gendered experience. These preliminary results suggest ways in which women in the Gallic provinces navigated the unique cultural landscape of Gaul under Roman rule.

Wilcox, David [335] see Howard, Jerry

Wilcox Black, Kelly (University of Chicago)

[167] *Zooarchaeology and the Study of Human-Animal Relationships in Pre and Early Historic South India*

The study of animal remains from archaeological sites has proven to be an invaluable approach to understanding past social, economic, and political practices. Despite the diverse behaviors and sets of relationships animal remains can index, faunal analysis has been an underutilized approach to studying Indian history and prehistory. In this paper, I present new research and zooarchaeological data to demonstrate how human-animal engagements changed throughout the Neolithic (3000–1200 BCE), Iron Age (1200–300 BCE), and Early Historic (300 BCE–500 CE) periods in South India. Using faunal remains from the site Kadebakele (Karnataka), I address how animal rearing, procurement, and consumption figured into the changing economic and agricultural regimes that ultimately laid the foundation for the emergence of urbanism in the region. In addition, I consider how a zooarchaeological study of human-animal relationships, in particular those forged through a history of animal husbandry, allow for us to critically engage with existing narratives concerning social and cultural change in South India.

Wilde, James (AF Civil Engineer Center)

[205] *Discussant*

Wilemon, Billy (Mississippi State University) and Michael Galaty (Professor and Dept. Head—Anthropology and Middle)

[287] *pXRF Analysis of the Pylos Linear B Tablets*

In 2015 and 2016 I analyzed all of the Mycenaean Linear B clay tablets and sealings from the Palace of Nestor at Pylos for their chemical composition using a portable X-ray fluorescence spectrometer. Sealings were used on containers of oil, wine, etc., and on baskets of tablets. Leaf-shaped tablets usually contain one entry or line of information. Page-shaped tablets contain several entries of related information. There are questions that these analyses may help answer:

- Did the sealings travel with material goods, or were they manufactured at the palace as materials arrived?
- When inscribed sealings are related to tablets, do they use the same or different clays?
- Do the tablet manufacturers use different clays, and were these manufacturers at the palace or located in remote areas?
- Can we gain insight as to whether the Archives Complex of the Palace was the functional economic center of the regional polity?

The answers to these questions will help us understand the controls placed on material wealth headed to the palace, how the tablet-writers interacted with goods brought to the palace, and how information entered the official record.

Wiley, Kevin (SUNY Buffalo)

[336] *Circles and Circuits: A Computational Social Science Approach to Neolithic Circular Enclosures*

Through the combination of Social Network Analysis (SNA), Agent-Based Modeling (ABM), and Geographic Information Systems (GIS), this paper will examine the relationship between physical and social networks in the Middle Neolithic of Central Europe. This Computational Social Science approach will provide insight into social aspects of the archaeological phenomenon of circular enclosures.

Wiley, Nancy, Andrew Garrison (Scientific Resource Surveys, Inc.) and Kassie Sugimoto (Scientific Resource Surveys, Inc.)

[300] *Markers of Time: Exploring Transitions in Artifacts and Burial Practices at Bolsa Chica, Orange County, California*

The transition of artifacts recovered from the Bolsa Chica Mesa indicate changes in site use through different temporal periods. Early (9000–7500 BP) Bivalve Tivela beads give way to Olivella spire/end modified, then to Olivella Grooved Rectangle (OGR) beads (5500–4500 BP). Transitions in bead type and manufacture can be linked to the changing coastline conditions, availability of resources, and the influx of new populations. Further, the burial practices found at the Bolsa Chica Mesa sites also vary by associated temporal period in addition to burial location. The burial types found on the Mesa illustrate a range of methods spanning from small bone assemblages to complete interments. Previous burial analyses have hypothesized that the Bolsa Chica Mesa was used as a ceremonial burial ground. This study attempts to assess whether the observed shift in burial practices is associated with changes in population demographics, cultural trends, or taphonomic processes by assessing the relationship between shell features; ceremonial artifacts such as cogged stones, charmstones, and beads; and the various burial practices found at Bolsa Chica.

Wiley, Taylor (Indiana University South Bend), Joshua J. Wells (Indiana University South Bend), Eric Kansa (Open Context), Patrick Finnegan (Indiana University South Bend) and R. Carl DeMuth (Indiana University Bloomington)

[195] *More than Just Another Number: Use of the Smithsonian Trinomial System and the Digital Index of North American Archaeology (DINAA) to Link Open Information about Archaeological Sites across the Web*

Archaeological sites in the United States are often associated with alphanumeric identifiers known as Smithsonian trinomial numbers (STNs). Developed in the mid-twentieth century, STNs consist of patterned alphanumeric sequences, potentially recognizable in spreadsheets, archival records, and research literature. The Digital Index of North American Archaeology (DINAA), a linked open data hub for archaeological site information, is attempting “named entity recognition” (a form of text mining) to identify STNs in archaeological literature. The grand challenge undertaken here will ultimately allow a DINAA user to browse, via map-based visualizations, cross-references between DINAA site file information and publications containing related STNs. This initiative includes human-guided cataloging of STNs from recent American Antiquity offerings, and software-enabled text mining of STNs from the entire run of American Antiquity through the JSTOR for Research program. Challenges include: variation in STN formatting, inclusion of STNs in various elements of research articles (abstract, body text, tables, figures, notes, etc.), and publication of competing identification strategies (e.g., state and museum systems). We will present results of this pilot study to inform future linked open data use of STNs in other archaeological literature, governmental records (e.g., Federal Register), museum collections, and archives.

Wilke, Detlef, Tuende Kaszab-Olschewski (independent researcher [archaeologist]) and Gerald Grimm (independent researcher [archaeologist])

[282] *Compositional Analysis of Roman and Late Medieval Terracotta Figurines Found in Worms (Antique Borbetomagus)*

Nondestructive XRF was used to provenance Roman and fifteenth-century molded figurines found in Worms, Rhineland-Palatinate (Germany). Three Roman kiln areas with waster material of various kinds of cooking and dining pottery were detected, but no coroplastics. Two kiln areas provided sherds with a highly uniform paste pattern identical to Roman amphora and roof tiles formerly analyzed by destructive WD-XRF, and supposed to be produced

in Borbetomagus. A third kiln additionally contained utilitarian pottery fragments of a distinct pattern, which could be identified with pottery and clays from Urmitz-Weissenthurm located some 130 km down the Rhine River, probably a domestic fill when the third workshop was shut down. Only one out of 14 Roman figurines exhibits the local paste pattern of the utilitarian pottery. It is an orange-fired single, whereas the other figurines were molded with a whitish paste similar in pattern with pottery from Speicher, near Trier (Augusta Treverorum), and from Koeln (Colonia Claudia Ara Agrippinensium). The late medieval molded figurines are production wasters of a workshop located in the center of Worms. The source of the special white-firing "pipe clay" is unknown, but compositionally similar to clayey kaolinitic sands in Tertiary lacustrine deposits in the nearby Palatinate Forest.

Wilkerson, Emily (Golder Associates Ltd.)

[42] *New Insights into Old (and New) Data: Lithic Technological Organization and Evolutionary Archaeology at the St. Mungo Site (DgRr-2), British Columbia, Canada*

Results from excavations at the St. Mungo site by Len Ham and his team in the early 1980s challenged previously held ideas about the Charles Culture (5000–3300 BP) in the Gulf of Georgia region. Previous research determined the Charles Culture was represented by egalitarian hunter-gatherer societies. Several lines of evidence were cited to support this idea, including both the absence of ground slate knives for intensive fish processing and storage technology which would have allowed people to overwinter in larger groups leading to socioeconomic complexity. Len Ham and team disagreed. Their work determined that stratified collector societies occupied the region during the Charles Culture, and they had data to support their theory. New data from several research projects over the past 10 years support Ham's conclusions, including lithic data from recent excavations at St. Mungo. A technological analysis of the new lithic data from St. Mungo suggests people had developed and organized a sophisticated lithic tool kit for processing large amounts of riverine resources, such as salmon, long before ground slate tools came into wide use in the region. Using an evolutionary archaeology framework, I assess how this tool kit was developed, modified and persisted into the Marpole Phase.

Wilkie, Nancy

[205] *Discussant*

Wilkins, Brendon (University of Leicester)

[70] *Crowdfunding, Crowdsourcing, and the Collaborative Economy: Old Wine/New Bottles, or Genuine Game Changer for Archaeology?*

DigVentures was launched in 2012 as a rewards-based crowdfunding platform designed to enable participation in archaeology and citizen science projects. We were formed by a small team of archaeologists, driven to action by what we saw as the three most pressing needs affecting our sector: the necessity for heritage professionals, museums and cultural organizations to reduce dependence on grants and state funding; the development of digitally enabled alternative finance models that diversify sources of funding; and the rise of the experience economy and popularity of citizen science. Our first campaign at Flag Fen stands as world's first-ever successfully crowdfunded archaeological excavation. Since then, we've repeated that initial success, crowdfunding a total of £150,000 for our projects, unlocking a further £700,000 in match funding from traditional grant-givers. Set within a broader economic trend that has seen the UK alternative finance market rise to £3.2b in 2015 (up 82% from £1.7b in 2014) and this new approach clearly offers promise. Drawing from specific examples from our project portfolio, in this short presentation I will explore the potential issues and practical steps that archaeologists can take to harness the crowd, and what differentiates this new model from anything that has gone before.

Wilkins, Jayne [40] see Schoville, Benjamin

Wilkinson, Darryl (University of Cambridge)

[265] *Refuge, Frontier, No Man's Land: The Changing Nature of the Andean Cloud Forests*

This paper will consider the Amaybamba Valley of southern Peru as an ecological and political frontier zone, from the late prehistoric era until the early colonial period. The Amaybamba region is a part of the cloud forest zone of the eastern Andean slopes, and is thus located where the highlands rapidly shift into the warm tropical lowlands of Amazonia. It is a region that has a complex and highly variable history, one reflecting its environmental characteristics, but often in unpredictable ways. Through a mixture of archaeological and documentary forms of evidence, the paper will discuss the occupation of the valley during the Late Intermediate Period (c. AD 1100–1400), on through to the Late Horizon (c. AD 1400–1532), followed by the post-conquest and Neo-Inca period (AD 1533–1572) and then finally the early colonial era (AD 1572–1650). As the paper will show, although there is always a strong relationship between the ecological and political frontier zones of the Amaybamba, the characteristics of this relationship were radically different across the centuries. No deterministic account of the region's ecological and political interactions can therefore provide an adequate explanation.

[265] *Chair*

Wilkinson, Patrick (University of California, Merced)

[175] *The Rock Art of Haitian Vodou*

This research is part of a larger ethno-archaeological investigation of the use of caves in modern Haitian Vodou rituals in Northern Haiti. This paper explores the modern rock art left in the caves as a result of Vodou ceremonies, in particular paint and veve (veve are symbols drawn out with cornstarch used to call various spirits to ceremonies, and are an intrinsic part of Vodou). The art in question included both permanent and ephemeral works, ranging from simple graffiti to caves painted with house paint in the colors associated with particular spirits.

Willerslev, Eske [330] see Damgaard, Peter de Barros

Willet, Patrick T. [371] see Vandam, Ralf

Willet, Alyssa [373] see Stone, Pamela

Willhite, Brenton (University of Missouri), Andrew Fernandez (University of Missouri), Andrew Krug (University of Missouri) and Christine VanPool (University of Missouri)

[155] *Paint It Black: A Geospatial Analysis of Chupadero Black-on-White Ceramics*

Chupadero Black-on-white ceramics were produced in the Salinas and Sierra Blanca regions of New Mexico beginning around AD 1100. They quickly gained popularity, covering a geographic region that encompassed much of the modern state of New Mexico, west Texas, southeastern Arizona, and

northern Chihuahua. Yet, despite their popularity, little is known about the exchange mechanisms that yielded Chupadero Black-on-white's impressive distribution. ArcGIS contains analytical applications that can be used to explore mechanisms of geospatial variation. This project uses GIS to investigate the processes behind the distribution of Chupadero Black-on-white ceramics in the prehistoric Southwest. We find that the processes change over time as exchange networks expanded during the fourteenth century.

Willhite, Brenton [237] see Krug, Andrew

Williams, Gareth (British Museum)

[15] *The Size and Character of Viking Armies in the Light of Viking Camps from England and Ireland*

In the ninth century, Viking "armies" are recorded raiding (and in some cases conquering) in Britain, Ireland, and the Frankish kingdoms. Contemporary sources indicate that the largest of these were comprised of hundreds of ships and, by inference, thousands of men. Many of these accounts give round numbers, and historical opinion is divided between those who accept that the figures may represent approximations rather than absolute historical fact, but are nevertheless representative of very substantial forces, and those who argue that the figures are exaggerated for effect, raising further questions of what constituted an 'army' in this period. Archaeologically, the movements of these armies have left relatively little trace. A number of hoards and single finds can be linked with historically documented movements of specific forces, but until recently a single partially excavated winter-camp at Repton in Derbyshire has provided a paradigm for the likely size and form of such sites generally, and has been taken to support the minimalist interpretation of Viking armies. The investigation in recent years of additional sites in England and Ireland points to the presence of much larger forces, while also pointing to diversity of activity which goes beyond traditional military definitions of Viking "armies."

Williams, Justin (Cultural Resource Analysts Inc.)

[89] *Clovis Style Hafted Bifaces: A Pan-Regional Perspective*

Many studies have made statements about the origin and method of the spread of the Clovis style hafted biface technology, but little research of late has evaluated Clovis from a Lithic Technological Organization perspective. This study examines a sample of 695 Clovis style hafted bifaces from across North America. I analyze trends in raw material use, flute length, reuse and resharpening in Clovis style hafted bifaces from across the country. I conclude that there is much variation in the types of raw materials used and the length of the flutes on Clovis style hafted bifaces. Additionally, this analysis reveals that Clovis style hafted bifaces are resharpened and retouched in an atypical manner. Finally, I use the results of this study to situate future questions that Pan-Regional studies of Clovis style hafted bifaces should pursue.

Williams, Katharine

[9] *Plumbate and Imitations*

Plumbate is a lustrous hard-paste ware characterized by small effigy vessels, some of which bear Central Mexican ideological influences. It was widely traded during the Terminal Classic/Early Postclassic across ethnic, political, and linguistic boundaries. Its widespread distribution and luster mark plumbate as unique among contemporaneous wares. It is sometimes found alongside locally produced wares that bear superficial resemblances, leading to the belief that they are imitations of plumbate. This research focuses on differences between imitation and plumbate wares with the goal of refining established criteria for distinguishing them. A secondary goal of this research is determining the production process of plumbate and both its luster and that of the imitations. In order to do this, compositional data (obtained via electron microprobe analysis) and recovery contexts of imitations and plumbate are compared.

Williams, Ken (Cahokia Mounds Museum Society) and John Kelly (Washington University)

[283] *Ground Truthing Cahokia's Feature X Anomaly*

A huge resistivity anomaly discovered several hundred meters northeast of Monks Mound was subjected to coring and test excavations in 2012. This testing revealed a series of major prehistoric landscape uses/modifications through time, some quite unexpected. The prehistoric sequence of events at this location, though still in need of further clarification, appear to infer significant shifts in communal priorities through time.

Williams, Mark (University of New Mexico)

[49] *Shellfish Harvesting Strategies on the Northern Northwest Coast: Evidence from Labouchere Bay, Southeast Alaska*

This poster presents new data from five shell midden sites on Prince of Wales Island, Alaska, in order to examine how shellfish-harvesting strategies changed during the middle to late Holocene. The accessibility and resilience of shellfish beds on the coastal margin makes them valuable resources that complement more seasonally-restricted food sources such as salmon runs. In order to meet the increasing needs of permanent settlements that emerged during the middle Holocene, shellfish management strategies would have had to adapt. Establishing specialized foraging camps and purposefully transforming sections of the intertidal zone into clam gardens would have improved the yield of shellfish beds owned by particular households. This research examines changes in the diversity and relative abundance of shellfish species within the middens at Labouchere Bay. Patterns of change are considered within frameworks of paleoecology, the priorities of individual foraging agents, and community-level settlement patterns and social organization. Analysis of stable oxygen isotopes reveals changes in environmental conditions at both a short-term seasonal scale and long-term climactic scale. Comparison with other sites in the region places these changes within the context of increasing sedentism and social organization.

Williams, Nancy (University of Tulsa), Nancy Williams (University of Tulsa), Thomas Foster (University of Tulsa) and Briggs Buchanan (University of Tulsa)

[197] *Social Change among the Lower Creek, the Late-Woodland to Historic Period*

The protohistoric and historic periods were times of great social change among Native Americans of the southeastern United States. The era saw mass migration and shifts in political association. The indigenous tribes of the Chattahoochee River, later known as the Creek, were no exception to the cultural changes of the time. The current historical and archaeological interpretation of these changes suggests that the Creek became more closely aligned, culturally, through time. These interpretations are based on historic documents, proximity and ceramic seriation and sequencing. This paper used social network analysis to test the current interpretations and determine if the relatedness of Creek and Creek ancestor sites, in middle and lower Georgia, Alabama and north Florida, changed over time.

Williams, Patrick Ryan (Chicago Field Museum) and Donna Nash (UNCG)

[29] *Radar, Lidar, Drones, and Donkeys: The Evolution of Archaeological Mapping Technologies in the South Central Andes*

In this paper, we review our use of digital technologies to model archaeological landscapes over the past two decades in Peru and Bolivia. We focus on three scales of analysis in four thematic areas that leverage state of the art technology and GIS modeling as a means for understanding the archaeological record. Our scales run from the built environment of local sites and monuments to regional agricultural landscapes to subcontinental interaction spheres. We look thematically at modeling urban space in ancient cities to creating anthropogenic hydraulic networks in agrarian systems. At the broadest scale, we examine the relationship between regions through the analysis of ritual landscapes and the networks of roads that link places together and how digital technologies have allowed us to integrate these scales of analysis in our work on the Wari and Tiwanaku states of the Andes.

Williams, Patrick Ryan [62] see Penfil, Rachael

Williams-Beck, Lorraine (Universidad Autonoma de Campeche)

[204] *Classic Maya Architectural Form, Function, and Urban Context in the Chenes Region, Campeche*

This paper revisits Classic Maya free-standing towers and portal vaults, some of which were first reported as isolated structures in the Chenes Region during the late nineteenth century. Recent research highlights not only formal attributes, but also their particular architectural compound and urban contexts not mentioned by previous studies. More complete architectural compound and urban layout data suggest new temporal and functional interpretations for these unique masonry features at Tabasqueño, Chanchen, Nohchen, and Nocuchich. These data also shed new light on particular north-south axis site location, previously ascribed an archaeoastronomical association in the literature, and possible tower/portal vault meaning in restricted access architectural compounds at these places within the immediate region.

Williamson, Kylie (University of Florida), Julia Giblin (Quinnipiac University), Jaime Ullinger (Quinnipiac University) and László Paja (University of Szeged)

[196] *Spatial Analysis and Sampling Techniques of Cremated Remains from Bronze Age Cremation Urns in Southeast Hungary*

Since 2011, members of the Bronze Age Körös Off-Tell Archaeology (BAKOTA) Project have excavated 57 cremation urns from the Békés 103 site in Southeast Hungary. This exploratory study seeks to examine the percentages of cranial and postcranial elements present in microstratigraphic levels in order to better understand the spatial distribution of bones within the burial urns. As a way to explore new approaches, two sampling methods were employed for the analysis of three burials. The first involved a random 20% sample of each microstratigraphic level, and the second involved the entire contents of each level. Across each level, fragments were classified as cranial, postcranial, or indeterminate, and total weights of the cranial and postcranial elements were recorded. These two methods were applied to test if the 20% sample adequately represented an entire cremation urn. Preliminary results suggest that the smaller sample has a similar distribution of cranial and postcranial elements within the urn. This is promising, as it allows for data to be collected more efficiently across numerous cremations. By deciphering the spatial distribution of the cremated remains, this study aims to better understand the mortuary practices utilized at the Békés 103 site.

Williamson, Ronald F. [30] see Pfeiffer, Susan

Willis, William (University of Nevada Las Vegas)

[155] *Spatial-Temporal Distribution of Prehistoric Puebloan Settlements and Ceramic Wares on the Shivwits Plateau*

During the summer of 2016, graduate students from the University of Nevada, Las Vegas conducted in-field ceramic analysis on Virgin Branch Puebloan sites found on the National Park Service portion of the Grand Parashant National Monument. Data collected from this project were analyzed in GIS in order to establish habitation site chronology in the region as well as address spatial artifact and settlement patterns through time as they relate to environmental variables. It is concluded that the land in the southern portion of the project area was favored more by the Virgin Branch during the early part of the region's occupation. However, relating changes in settlement distribution patterns and land use through time to environmental variables is not straightforward. Finally, the findings of this study lend support to the hypothesis that Shivwits Ware ceramics were produced in the far southern portion of the Shivwits Plateau.

Willison, Megan (University of Connecticut)

[252] *Two-Spirits or Changing Gender Roles? An Investigation of Mortuary Remains in Southern New England*

Funerary objects from three seventeenth-century burial grounds were statistically associated with biological sex categories to discern what, if any, burial items were related to the sex of an individual. A handful of material objects proved to be almost exclusively associated with either sex; what also appeared from this analysis was the discovery of two burial assemblages that possessed a mixture of what are believed to be solely male or female burial goods. Utilizing archaeological and linguistic data, this paper suggests that one explanation for these two burial contexts is the occurrence of non-binary gender systems in seventeenth century southern New England. If not representative of two-spirits, this paper argues that these burial assemblages may instead reflect changes in gender roles resultant from European cultural contact and acculturation. This research has implications for broadening the scope of known non-binary gender structures in North America and discerning further evidence of indigenous cultural change and perseverance in the seventeenth century.

Willoughby, Pamela (University of Alberta)

[146] *A Middle and Later Stone Age Sequence from Iringa, Southern Tanzania*

Magubike rockshelter in the southern Highlands of Tanzania contains a long archaeological sequence ranging from the Middle Stone Age (MSA) through historic times. This paper describes the lithic sequence from test pit 5, which contains a 2.5 m thick cultural deposit composed of recent/historic remains, an Iron Age, a microlithic Later Stone Age (LSA), a macrolithic LSA, a transitional sequence from the MSA to the LSA and 90 cm of MSA artifacts. The later part of the sequence replicates the cultural deposits at the nearby shelter of Mlambalasi, where the microlithic LSA dates to the early Holocene and the macrolithic LSA to the late Pleistocene. The entire sequence gives a baseline for technological change at Magubike and for other sites in the Iringa region.

[146] *Chair*

Willoya-Williams, Raven [394] see Guilfoyle, David

Wills, Chip (University of New Mexico)

[130] *A Three Dimensional Reconstruction of the Pueblo Bonito Mounds*

There are two large mounds on the south side of Pueblo Bonito that were extensively trenched in the late nineteenth and early twentieth centuries. Data from the re-excavation of three trenches are combined with new geospatial and remote sensing information to create a three dimensional reconstruction of mound history. Although low walls were built around parts of each mound at some point, there is no evidence that the mounds were ever enclosed by architecture. The mounds consist mostly of household debris and discarded construction material that was placed over buried artificial and natural channels that directed surface flows past Pueblo Bonito until late AD 1000s. Our reconstruction emphasizes the relationship between built environment and stream dynamics during the Bonito Phase (ca. AD 850 to 1200).

[130] Chair

Wills, Wirt [130] see Hamilton, Marian

Wilmeroth, Joana [210] see Lenssen-Erz, Tilman

Wilson, Dylan [7] see Wisner, Gavin

Wilson, Gregory (UC-Santa Barbara) and Timothy R. Pauketat (University of Illinois, Urbana)

[20] *The Organizational Implications of Architecture at Moundville and Cahokia*

What practices generated the largest and most complex Mississippian centers? We examine this issue through an analysis of Mississippian public and ritual architecture from Moundville in west-central Alabama and Cahokia in southwestern Illinois. Politico-religious buildings and associated practices or powers constituted the historical development of both places. Cahokians created a wider variety and more complicated distribution of such buildings than did Moundvillians. We argue that the Cahokian architectural order provides evidence of supra-kin movements that help to explain that region's complex ritual-residential precincts, nodal site networks, and farming districts. These relationships operated as part of a more centrally administered and regionally articulated mode of sociopolitical organization than existed at early Moundville.

Wilson, Katherine

[365] *The Ceramic Assemblage from Washington Mounds: A Caddo Site in Southwestern Arkansas*

The Washington Mounds site is an Early to Middle Caddo period (AD 800–1300) mound site with 11 mounds, some of which contain burials; two village areas are associated with the site surrounding the mounds. It is located in southwest Arkansas between the Red River and Little Missouri River Basins. Some level of ritual activity occurred at the site, but the types or scale was previously unknown. Two excavations have been done at the site: first in the early twentieth century by M. R. Harrington, and a second in 1981 by the Arkansas Archaeological Society and the Arkansas Archaeological Survey. Whole pots and potsherds from both documented excavations are considered in the analysis as well as pipe fragments (Red River long-stem varieties) to determine periods of use as well as ritual themes prevalent at the site. This study is an analysis of the ceramic assemblage through the theoretical perspective of ceramic ecology. As this is the first thorough analysis done at this site, the goals of the research include establishing information on life, status, and ritual activities of the people who occupied this site.

Wilson, Michael (Department of Earth & Envir Sci [Emeritus], Douglas College)

[307] *Geoarchaeology and Chronostratigraphy of the Sheep Rock Spring Site, Late Pleistocene to Holocene, Missouri River Headwaters Region, Southwest Montana*

The Sheep Rock Spring site (24JF292) lies in a small SW Montana valley between Sheep Rock and a residual tor. A late Quaternary sequence (>5 m) supports a chronostratigraphic model from dates on charred material in the upper two units: 1) basal rock landslide diamict; 2) down-valley debris flows; 3) final Pleistocene-early Holocene (FP-EH, >10,200–8700 RCYBP) channel/floodplain alluvium and paleosols; and 4) mid-Holocene (MH, ca. 6000–5430 RCYBP) alluvial/colluvial fan with paleosols. Radiocarbon (N = 26) and stable isotope measurements underpin the age-model, with local events superimposed on regional early Holocene warming and drying. Samples include charred material (n = 11), organic sediments (n = 5), bone "collagen" (n = 7), and wood (n = 3). Residual bone organics from extinct megafauna among the landslide boulders gave a pre-Last Glacial date of ~20,700 RCYBP, doubtful given a 13C/12C ratio of –33.1‰. Dated contexts provide evidence for introduction of relatively small corner and/or side-notched projectile point types from terminal Paleoindian times onward. Artifacts suggest intermittent, short-term camping and tool production. Artifact redeposition also raises concern for some dating samples. Organic sediment dates agree with the age-model (9060–8200 RCYBP for FP-EH, 5510–4720 RCYBP for MH), while wood and some measurements on acid-insoluble bone fractions do not; water-table fluctuations may be responsible.

[307] Chair

Windes, Thomas [130] see Mills, Barbara

Wineinger, Robin (New Mexico State University)

[92] *Sex-Related Differences in Dental Caries Prevalence in the Prehistoric American Southwest*

This research comprises a comprehensive study of oral health from three prehistoric Southwest sites in order to identify sexual differences in the prevalence of dental disease after the onset of agriculture. Dental pathologies, such as dental caries and antemortem tooth loss (AMTL), directly relate to an individual's diet, therefore indicate disparities in subsistence and dietary patterns. Previous studies have found that females exhibit higher rates of caries compared to males. These differences are considered to be the result of physiological, behavioral, or social variances between or within communities. My research reveals further insight into regional and temporal perspectives among pueblo skeletal samples. Specimens from the Southwestern sites of Pottery Mound (LA416), NAN Ranch (LA2465) and Kuaua Pueblo (LA187) were used for this research. I examined 57 male and 56 female dentitions to uncover possible sex-related disparities in dental caries. Males and females from Pottery Mound and Kuaua exhibited similar rates of dental caries and AMTL, suggesting no distinct variation in dietary patterns or behaviors between the sexes. NAN Ranch held the most statistically significant differences between males and females, indicating that the factors associated with the development of dental pathologies are complex and ultimately depend on site-specific dynamics.

[92] Chair

Winemiller, Terrance [281] see McKillop, Heather

Wingert, Sara (Kutztown University) and Khori Newlander (Kutztown University)

[260] Missing the Point: Identifying Perishable Projectiles in the Archaeological Record

For decades, archaeologists have used replicative studies to develop a better understanding of prehistoric technology. Many replicative studies have focused on the manufacture and use of stone projectiles, resulting in a detailed understanding of the design of hunting weapons in relation to various features of the environment and, in turn, elegant explanations for technological change over time. Yet if ethnographic accounts are any indication, lithic technology was only one (perhaps minor) part of many prehistoric technological systems. It is likely, then, that the technological changes we document through our morphometric analysis of stone projectile points occurred against a backdrop of perishable technologies often not represented in the archaeological record. Here, we report on a replicative experiment designed to investigate whether we can "see" perishable projectiles in the archaeological record based on the damage they inflict on animal bones. Specifically, we examine if wood-tipped, fire-hardened, and stone-tipped arrows produce distinctive damage signatures. We use the results of our study to examine explanations offered to account for the transition from the dart to the bow and arrow in North America.

Wingfield, Laura

[310] Collecting Costa Rican and Nicaraguan Art: On the Case of Enrique Vargas Alfaro, Dealer

In the mid-twentieth century crates full of Costa Rican antiquities made their way into the United States through the diplomatic immunity of Enrique Vargas Alfaro. Paul Clifford, then a business man in Miami and later donor and curator at the Duke University Museum of Art, purchased works from Vargas in addition to procuring his own pieces from Peru. Clifford's friend Bill Thibadeau of Atlanta and a few of his neighbors enjoyed "block parties" to open the latest Vargas crate and then to divvy up the goodies inside. The Mayers of Dallas and later Denver also purchased pieces from Vargas. As the laws changed against such collecting efforts, some of these collectors also changed their ways, while others continued to procure new pieces and/or to defend these collecting practices. Through several decades of researching Nicaraguan and Costa Rican art (Nicaraguan pieces were often traded into Costa Rica in ancient times and interred there, coming to light in the twentieth century through looting), I am slowly uncovering more and more details about the story of how these pieces came to the United States and how this case study fits into the greater dilemma of collecting antiquities in the twenty-first century.

Winstead, Seth, Katherine Miller Wolf (Indiana University East) and Hannah Plumer (Niagara County Community College)

[8] Estimating Sex from Bones of the Hands and Feet: A Bioarchaeological Study of the Ancient Maya Site of Blue Creek, Belize

For bioarchaeologists, biological sex estimation based off of skeletal indicators is a crucial element when creating a biological profile for human remains. While there are several ways for estimating sex, primarily involving examining cranial and pelvic morphology, one useful method that remains underutilized is metric analysis of bones from the hands and feet. Since males and females are sexually dimorphic, the ability to discriminate biological sex from hand and foot bones is possible and is shown to be valid. Skeletal metric data drawn from the hands and feet have successfully discriminated between male and female (bio)archaeological remains in Europe and throughout North America. Osteometric data for a Maya population from Nojol Nah in the Blue Creek region of Belize are presented to demonstrate the utility of such metrics in estimating sex. These data are useful to archaeologists or bioarchaeologists working with fragmentary or isolated remains in the field or lab.

Winterhalder, Bruce (Anthropology, UC Davis), Luis Pacheco-Cobos (Ecologia Conductual Humana, Universidad Veracruzana), Carmen Cortez (Graduate Group in Ecology, UC Davis), Estrella Chevez (Biología, Universidad Veracruzana) and Chloe Atwater (Anthropology, UC Davis)

[162] The Effects in a Maya Community of School Enrollment on Young Adult Time Allocation to Activities Dependent on Traditional Ecological Knowledge

School enrollment in traditional communities potentially compromises young peoples' participation in agro-ecological subsistence activities that encourage the development and practice of traditional ecological knowledge (TEK). Drawing on data from a Maya community located in Toledo District, Belize, we compared the time allocated to agro-ecological activities for school going (SG) or non-school going (NSG) male and female youth between the ages of 13 and 18 years. We find that SG males spend relatively less time engaged in agro-ecological activities (compared to leisure, eating, personal hygiene, and visiting) than do NSG males. School enrollment, however, does not affect the time females devote to subsistence-related activities. Regular school attendance thus appears to have a greater effect on young men than women. As a remedy, we propose and briefly describe a field-developed, active learning curriculum for Mayan high school students focused on milpa agro-ecology and forest subsistence activities in which traditional and scientific experiences can be shared. While data on age-specific commitment to subsistence activities can help us to understand the effectiveness of the prehistoric milpa economy, we focus here on reducing contemporary conflicts between formal education and traditional ecological practices.

Winterhalder, Bruce [383] see Jazwa, Christopher

Wise, S. Andrew

[241] Midden Muddle

Archaeologists occasionally find inconstant artifact assemblages between sites that appear similar. These variations in artifact frequency and diversity can hinder efforts to establish a one-to-one correlation between artifacts and cultural behaviors. However, coastal shell middens can provide important information regarding past habitation and social organization. By using shell and artifact distribution data, this research examines how Woodland cultures utilized coastal sites between 1000 BC to AD 1000. A comparative analysis of multiple midden assemblages from the Georgia and South Carolina coast demonstrates that there is considerable divergence at the inter-assemblage level. Close attention was paid to significant artifact patterns in the hopes of confirming a standard midden typology. Priority was given to the presence of burials and features due to their strong association with human activity and social organization. While ultimately sites are variable and cannot be forced into sterile categories, archaeologists can look at all measured variables to identify unique and helpful patterns.

Wisely, Justin (Far Western Anthropological Research Group, Inc.)

[274] Starch Grain Analysis of Bedrock Mortars in California: Implications to Our Understanding of California Prehistory

Starch grain analysis is a growing field in California archaeology, with the potential to significantly add to our understanding of prehistoric peoples. Using a nondestructive extraction method for field sampling bedrock mortars, I was able to extract microscopic plant residues from the mortar surface for analysis. The subsequent identifications were made using my ethnographically-informed comparative collection of modern native plants. The results of this research indicate that the function of bedrock mortars is significantly more varied than currently assumed, and that small seed processing played a much larger role in California subsistence than previously thought.

Wiseman, Grant [336] see Amundson, Leslie J.

Wisner, Meredith (University of Iowa)**[181]** *Ungulate Bone Fat Exploitation at the Adoption of Horticulture in Western Iowa*

Fat in the form of bone marrow and/or grease is a valued resource among foragers, and is more frequently exploited during times of subsistence stress. Risk-reduction in the face of resource stress is one potential theory for why prehistoric people incorporated horticulture into existing hunting and gathering practices. During the Woodland period (2800–1350 BP), the tallgrass prairie region of western Iowa provided a rich environment where numerous prey species could be found, including bison and deer. This paper examines subsistence stress during the adoption of horticulture by focusing on evidence for the utilization of bone fat within highly ranked ungulate taxa present at a selection of Woodland period sites within western Iowa. This research provides one line of evidence from which to examine the underlying factors involved in the shift toward production economies which occurred in later prehistory.

Wisner, Gavin (Northern Arizona University), Katie Tappan (Northern Arizona University), Dylan Wilson (Northern Arizona University), Chrissina C. Burke (Northern Arizona University) and Norbert Stanchly (AS&G Archaeological Consulting)**[7]** *Animal Use in Ancient Maya Terminal Deposits: Examining Faunal Remains from Sites in the Belize Valley to Identify Ritual Activities*

Zooarchaeological materials from terminal deposits in the Belize Valley have the potential to assist archaeologists with understanding if terminal deposits represent ritual activities. This poster presents the results of zooarchaeological investigations of terminal deposits at the sites of Lower Dover and Baking Pot. While archaeologists from the Belize Valley Archaeological Reconnaissance Project (BVAR) have focused on the pottery and lithic materials in these deposits a thorough comparative analysis of the faunal remains from both sites has not previously been completed. Our analysis focuses specifically on the skeletal elements and species present, evidence for worked bone or cutmarks, and taphonomic features that may assist with deciphering influences on the deposits through time. Comparing these two sites will assist with understanding if the faunal materials from terminal deposits can provide information on the use of animals in ritual activities by the Maya and to further the understanding of the purpose for terminal deposits in the region.

Wisner, Gavin [321] see Burke, Chrissina C.

Wissing, Christoph [284] see Bocherens, Hervé

Witschey, Walter [224] see Bates, Brian

Witt, David (NYS Department of Environmental Conservation) and Kristy E. Primeau (NYS Department of Environmental Conservation)**[192]** *Soundscapes in the Past: Interaudibility in the Chacoan Built Landscape*

Sound has been a long disregarded aspect of the cultural landscape, despite being an important factor in how we, as human beings, interact with the wider world. By incorporating a consideration of sound, archaeologists can more fully understand the embodied experience explored through phenomenological approaches. In this poster, we investigate the interaudibility present within the built landscape of Chaco Canyon, using a GIS tool we have developed over the past two years. Focusing on Downtown Chaco, we present a soundscape, illustrating how events at shrines, stone circles, isolated kivas, and great houses may have been heard at other locations.

Witt, Kelsey (University of Illinois at Urbana-Champaign), Julie M. Allen (Illinois Natural History Survey, UIUC), Steven R. Kuehn (2. Illinois State Archaeological Survey, Prairie R), Mary L. Simon (2. Illinois State Archaeological Survey, Prairie R) and Ripan Malhi (Department of Anthropology, University of Illinois)**[181]** *Dietary DNA Analysis of Mississippian Dog Coprolites*

Traditional methods for assessing diet of animal coprolite samples include targeted PCR and sequencing of specific genes. While useful for species identification, focusing on a single gene region disregards the plant and animal DNA fragments that are from other parts of the genome. Here we used next-generation sequencing methods to sequence DNA from coprolite samples from Terminal Late Woodland and Mississippian dogs from the Janey B. Goode site in Southern Illinois. BLAST searches were used to compare the sequenced reads to complete mitochondrial and chloroplast genomes of plants and animals. Analysis of the coprolites demonstrates that the dogs at Janey B. Goode ate an animal diet of fish, which correlates with previous zooarchaeological analyses of coprolite contents, and a more varied plant diet that included sunflowers, and, in some of the dogs, maize. The presence of maize in the diet of the dogs is significant because maize was an important part of Mississippian culture, and determining the age of the coprolites can help assess when maize arrived to southern Illinois, the timing of which has not yet been clarified. This research demonstrates that next-generation sequencing of coprolites can yield more diverse dietary information than targeted PCR methods.

Wobst, H. Martin (University of Massachusetts)**[65]** *Discussant*

Woehlke, Stefan [2] see Sonderman, Robert

Wohlgenuth, Eric and Maria C. Bruno (Dickinson College)**[388]** *Intensive Use of Wild Chenopodium by Central California Hunter-Gatherers*

Three decades of California paleoethnobotany have shown that Chenopodium is the most common small seed found in central California archaeological sites. Chenopodium is concentrated in sedentary residential communities in lowland areas, where historical population densities rivaled or exceeded those found elsewhere in the world. The most intensive use known for Chenopodium is from wetland areas of the Sacramento and Santa Clara valleys. Despite thousands of years as the preeminent small-seeded plant food and good reason to suspect active wild plant management, initial recent studies reveal no evidence of Chenopodium domestication in California.

Woldekiros, Helina (Washington University in Saint Louis)**[171]** *Early Farming Communities in East Africa and the Horn: New Zooarchaeological Evidence from Mezber, Northern Ethiopia*

Animal herding formed a central component of Pre-Aksumite (>800–450 BCE) and Aksumite (450 BCE–800 CE) subsistence economies in the North Ethiopian and Eritrean highlands. Despite this, detailed understanding of animal utilization and diversity of species is lacking for this period. New data on

species abundance and radiocarbon date from the site of Mezber in the North Ethiopian highland throws a new light on the earliest mixed farming communities in the Horn of Africa over the last 3,000 years. This rural settlement site provides faunal evidence for herd management strategies. Cattle, sheep, and goats are integrated with chickens originating from the Red Sea area. Cattle make up a high proportion of the assemblage through time. This relative high abundance of cattle indicates an environment that was stable and supported stock keeping for at least 1,000 years. The presence of a small percentage of wild animals in the Mezber assemblage shows animal husbandry that was complemented by hunting systems.

Wolf, Marc (GC CUNY)

[346] *GIS, Identity, and the Sacred Landscape*

GIS techniques are no foreigner to Mesoamerican studies though the hybridization of digital analytics and human identity is incomplete. In recent years suites of technologies have allowed for better visualization of data within archaeological projects. Though computer programs and higher profile data-gathering techniques have become widely embraced by the archaeological community, research should be rooted in cultural proclivities as well. By recording the complex shifts in topography via remote sensing, drafting architecture based on satellite derived data, and using excavation data to corroborate architectural data within the paradigms of computer driven analytical techniques, new patterns and questions emerge. This paper will focus on recent GNSS mapping of the archaeological site of Cancuen in the Transversal region of the interface between highlands and lowlands. The site offers a unique application and integration of GIS techniques while acknowledging the importance of the human element behind the constructed landscape.

Wolf, Sara (DOI-NPS-NMSC)

[2] *Emergency Response PTSD, Climate Change Denial, and Resiliency: The New World Disorder*

Curators and conservators have been wading through water for decades to rescue museum collections after natural and man-made disasters. The urge to "fix" things that have broken seems to be rooted in our DNA. Since 2003, I have had the opportunity not only to be a part of the emergency response community, but to witness the impact of these events on responders and collections. At the same time, there has been the development of an entire museum emergency response profession, a dramatic uptick in the commercial response field, and a piling-on of emergency response training. The disaster response culture also has spawned full academic programs, nearly endless analyses of motive, culture class, and emergency psychology that aim to improve our response future. Actual responses, however, appear to polarize around avoidance changes; tied to fears about climate change, or defensive actions founded on denial. In both cases, tending to be focused on "fixing," we have incorporated the idea of building resiliency into the architecture without considering threats from the wider external environment. This presentation seeks to resolve the natural tendencies of people to express either, "it won't happen here (again)," versus the Chicken Little Syndrome.

Wolff, Christopher (University at Albany)

[144] *Subarctic Coastal Pioneers: Evidence and Implications of a New Maritime Archaic Site in Eastern Newfoundland*

The earliest colonization of the island of Newfoundland was by a coastal and marine oriented people belonging to the Maritime Archaic tradition (ca. 8000–3200 BP). The exact timing and nature of that colonization and subsequent "settling in" process remains largely unknown. Part of the reason for this is the dearth of well-dated, systematically excavated habitation sites on the island during the Archaic period. In the summer of 2016, our excavations at the Stock Cove site on the coast of southeastern Newfoundland recovered a significant artifact assemblage that suggests an extensive Maritime Archaic occupation. This provides some of the first evidence for the settlement of that region from a secure stratigraphic context. In this paper we will present initial analyses of these recent finds and briefly discuss their broader significance to our understanding of the role that coastal adaptations played in the colonization and settlement of northern post-glacial regions in the North American Eastern Subarctic.

[144] *Chair*

Wolffhagen, Jesse (Stony Brook University)

[73] *More Than a Source of Data: The Benefits of Active Collaboration between Macrofaunal and Specialist Analyses at Neolithic Çatalhöyük*

The faunal remains excavated by the Çatalhöyük Research Project are notoriously voluminous, making them the focus of many specialist analyses over the course of the recent project. Stable isotopic data from zooarchaeological remains have long been used to inform paleoecology and past human dietary patterns. Zooarchaeological isotopic data have increasingly been used to revolutionize our understanding of past herding strategies, particularly in early herding contexts like Neolithic Çatalhöyük. The resulting large datasets from zooarchaeological and isotopic studies at Çatalhöyük have provided crucial data for understanding characterizing past diets, herding systems, and ecologies. However, these datasets have been largely fragmented from one another by the initial structure of the Çatalhöyük Research Project and its faunal database, as well as the logistics of coordinating in-field and off-field research agendas. This paper discusses the potential for more concerted integration between stable isotopic and zooarchaeological data by demonstrating how consideration of an animal's age and sex can help restructure stable isotopic comparisons of animal diet to reflect past herding systems. The opportunities afforded by this integration are broadly applicable and help reframe the isotopic analysis of zooarchaeological data from a source of background, ecological data toward an avenue for investigating past social dynamics.

Wolffhagen, Jesse [181] see Otárola-Castillo, Erik R.

Wolin, Daniela (Yale University), Yuling He (Institute of Archaeology, Chinese Academy of Social Sciences), Zhonghe Liang (Institute of Archaeology, Chinese Academy of Social Sciences), and Junfeng Guo (Jinan Institute of Archaeology)

[113] *An Intersite Comparison of Human Skeletal Trauma in Shang Dynasty China*

Participation in the near-constant military campaigns of the Late Shang dynasty of China may have constituted an important social role for much of the population. Archaeologists have employed mortuary analysis and a close-reading of contemporaneous oracle bone inscriptions to help elucidate the nature of warfare and its participants. A large-scale bioarchaeological analysis of human skeletal remains could not only provide valuable insight on the relationship between weaponry as grave goods and possible participation in violent interactions, but also illuminate the overall experience of traumatic events at the population level. This paper presents the bioarchaeological analysis of trends in traumatic lesions among a population from the Liujiazhuang locale of Yinxi in Henan Province. Patterns in the distribution of lesions on the body are examined to assess whether they are more likely to result from accidental injury or intentional violence, along with a demographic analysis of who in the population is affected by diverse types of trauma. These results are then compared to two sites with Late Shang components in Shandong Province, Jinan Liujiazhuang and Qianzhangda, to assess how differences in the distribution of trauma may reflect differential participation in warfare-related events or variations in lifestyle and activity.

Wolverton, Steve [96] see Scott, Ashley

Womack, Andrew (Yale University)

[213] *Use Wear and Standardization Analysis of Pottery from Dibaping, a Banshan Period Cemetery in Southern Gansu Province, China*
Excavated in 1978, the cemetery at the site of Dibaping in southern Gansu Province, China revealed hundreds of Banshan period (2600–2300 BC) ceramic vessels. The elaborately painted geometric motifs on many of the vessels led to them quickly being touted as an example of the pinnacle of artistic achievement in Neolithic northwestern China. Aside from typology, however, no other analyses have been done on these objects. The result is that little is known about how these vessels were created, the role that they played in mortuary practices, or even if they were used before being interred. This paper will present the results of recent use wear and standardization analysis of these vessels and the effect these have on our understanding of their production, use, and deposition. These results will then be framed within our wider understanding of the benefits and limitations of use wear and standardization analysis, and our current knowledge of Banshan period production and consumption practices.

[213] *Chair*

Wong, Megan (Simon Fraser University), Martin Steskal (Austrian Archaeological Institute), Elise Naumann (University of Oslo), Johann Rasmus Brandt (University of Oslo) and Michael P. Richards (Simon Fraser University)

[151] *Diet and Mobility in Roman and Byzantine Turkey*
Isotope analyses (C, N, Sr) have been conducted on human skeletal remains (n = 150) from the Roman and Byzantine periods (ca. 133 BC–ca. 1453) from the sites of Hierapolis and Ephesos (Turkey) to characterize and compare their diet and mobility. In addition we undertook a large-scale strontium isotope-mapping project in the region, modern plant and snail samples are also used to characterize the local bioavailable strontium values in southwestern Turkey. Hierapolis and Ephesos were both major centers of spiritual and commercial activities during the Roman and Byzantine periods, and were important pilgrimage sites. This study has allowed us to be able to explore the diet and mobility patterns of residents of these sites, and also to look for isotope evidence of migrants and pilgrims. This large-scale study is ongoing and here we will present the initial results.

Woo, Katherine (University of Sydney)

[374] *Paleoeconomies in the East Alligator River Region, Australia*
The East Alligator River Region has undergone considerable environmental change throughout the Pleistocene and Holocene, with changing sea levels dramatically altering the ecosystems of this region. Current archaeological models for this region indicate that people adapted their economic activities to successfully exploit these shifting environments. Mollusks have played an important role in the economic activities of these groups and often comprise large portions of the regional assemblages, but they have not been subject to in-depth studies. Detailed analyses of midden material from rockshelter sites will develop a more comprehensive understanding of the changing economic role of mollusks, both in subsistence and as a raw material for tool use. Additionally, this project will use the known biological and ecological information available for these organisms as environmental proxies, in combination with existing data, to reconstruct the past environments at these sites and to examine and build on current models of long-term human behavior and use of coastal resources. These detailed analyses of the molluscan material provides new lines of evidence enabling reexamination of preexisting models for the region.

Wood, David [94] see Martz, Hans

Woodfill, Brent (Georgia State University)

[281] *Inland, Urban vs. Coastal, Rural Salt Production in the Southern Maya Lowlands: The View from Salinas de los Nueve Cerros*
Salinas de los Nueve Cerros is the only non-coastal salt source in the Maya lowlands. For over two millennia, Nueve Cerros' residents produced massive quantities of salt that was commercialized throughout the western Maya world. Unlike the Caribbean salt works, the salt here was contained within a large urban zone. The salt works used a variety of techniques to make the finished product, boiling brine and leaching salt-laden soils as in Paynes Creek but also scraping the salt flats. Each of these activities occurred in contexts that were tightly controlled by the ruling class—the workshops were adjacent to administrative structures containing wealthy tombs and both the salt dome and the brine stream were ringed by palaces, temples, and other elite structures that marked them as restricted, elite space. While the elite did control access to the salt source and the whole production process, the public had access to large quantities of the finished product, which they were able to use to produce a variety of secondary products—salted fish and meats, leather, etc.—without any evidence of elite involvement beyond the salt itself. By focusing their efforts on controlling salt, they inserted themselves into nearly every economic activity there.

Woodfill, Brent [218] see Rivas, Alexander

Woods, Heather [92] see Jansen, Amelia

Woodson, Kyle (Gila River Indian Community)

[335] *The Impact of Changes during the Hohokam Classic Period on Irrigation Agriculture and Irrigation Management in the Middle Gila River Valley, Arizona*

This paper examines the impact of changes during the Hohokam Classic period on the social organization of canal irrigation management along the middle Gila River in south-central Arizona. A series of important social, political, and environmental changes occurred during the Hohokam Sedentary to Classic period transition. This study examines this transition to see if it represents a hinge point in how irrigation was organized. The focus is on the irrigation organization which is the social institution that manages and assigns the roles to accomplish the tasks of managing an irrigation system. Another aspect of the study assesses how irrigation organizations are linked with the related political institutions as well as with each other. This helps to evaluate whether political leaders attained control over production or surplus from the canal systems in an effort to achieve higher sociopolitical status. The study is accomplished through an analysis of canal systems and settlement patterns at the village of Snaketown, as well as the neighboring Granite Knob, Santan, and Gila Butte canal systems and settlements. With this study, I return focus to Snaketown where Emil Haury originally defined the Hohokam cultural tradition, and reveal new insights into the prehispanic Southwest.

Woodson, Kyle [105] see Medchill, Brian

Woolard, Katherine (University of North Carolina Wilmington) and Briana Pobiner (Smithsonian Institution)

[85] *Cautionary Tales in the Use of Captive Carnivore Tooth Mark Data*

Evidence for hominin meat acquisition in the form of butchery marks on fossil animal bones dates back to at least 2.6 million years ago. With this new dietary behavior came competition between hominins and large carnivores for animal carcasses. Identifying which carnivores hominins were interacting with would allow various models of the timing and sequence of hominin and carnivore carcass to be evaluated. However, many studies of carnivore tooth marking and damage patterns are conducted with captive carnivores, without considering if captive samples are actually comparable to wild samples. We analyzed tooth pits created by captive and free-ranging lions in Kenya using a Dino-Lite microscope and found that while tooth pit sizes are similar, frequencies are different—larger groups of carnivores generally inflict more tooth pits. Therefore we advocate caution in using captive samples as models for the frequency of tooth pits inflicted by specific carnivore species. However, as the number of tooth pits may be indicative of the number of carnivores feeding on a prey animal, tooth pit frequencies may be useful for reconstructing whether social (e.g., lion, hyena) or solitary (e.g., leopard, sabertooth) carnivores were most likely responsible for tooth marks in some fossil assemblages.

Woollett, James (Université Laval—Centre d'études nordiques), Paul Adderley (Center for Environmental History and Policy, Unive), Céline Dupont-Hébert (Université Laval—Centre d'études nordiques), Guðrún Alda Gísladóttir (Fornleifastofnun Íslands, Iceland) and Uggi Ævarsson (Minjavörður Suðurlands, Iceland)

[190] *Ecohistories of Settlement of the Community of Svalbard, Northeast Iceland*

The Archaeology of Settlement and Abandonment of Svalbard research program has reconstructed chronologies of settlement movements on the Svalbard estate (extreme northeast Iceland), from the ninth to the nineteenth century AD, as well as their environmental and socioeconomic contexts. Settlement expansions occurred in the tenth to thirteenth and the eighteenth to nineteenth centuries AD, interspersed with waves of widespread abandonment after ca. 1300 and 1800. Analyses of amended soils and of soil and air temperature and humidity data from sites across the estate allow assessment of the productive potential and growing season of particular farms during past climate regimes. Thereby, thresholds of viability for particular farms can be projected. Climate-driven environmental changes figure in the first phase of abandonment, but to varying degrees in individual farm sites. Landscape archaeology and zooarchaeology studies suggest that ongoing changes in herding and subsistence economies and land holding institutions were also key motivators of settlement and abandonment trends. Farms differ greatly in productive potential while soil humidity was a key variable limiting their resiliency. The enclosure of favored sites early on argues for a centralized, redistributive, pattern of land management. Finally, the anthropogenic soil "memory" of successful prior settlement favored continued settlement thereafter.

Woolman, Jason [17] see Rowley, Susan

Woolwine, Lauren (University of Pittsburgh), Lucy Atha (University of Kent), Nicholas Shepetuk (University of California Berkley), Hannah Plumer (Niagara County Community College) and Katherine Miller Wolf (Indiana University East)

[8] *Keeping It in the Family? An Investigation into the Relatedness of Individuals Found in an Ancient Maya Chultún*

The ancient Maya site of Blue Creek, located in northern Belize, has revealed archaeological evidence suggesting regional occupation from the Preclassic through Terminal Classic periods. The excavation of one Late Classic group (550–830 CE), Kin Tan, by the Maya Research Project revealed a chultún containing the remains of five commingled individuals of various ages. Examination of these skeletal remains revealed some commonalities in postcranial nonmetric traits among those interred within the chultún. Data were collected on 17 cranial and postcranial nonmetric traits in order to determine whether the individuals within the Kin Tan chultún could be biologically related. Several common traits were observed (septal apertures, marginal tubercles, and suprasternal spines) in the sample, supporting the hypothesis that those individuals entombed within the Kin Tan chultún are potentially biologically related. This research helps to shed light on the mortuary rituals and funerary traditions of the occupants of Blue Creek.

Workinger, Andrew and Stacie King (Indiana University-Bloomington)

[137] *Obsidian Blade Production and Husbandry in the Nejapa/Tavela Region of Oaxaca, Mexico*

Studies of obsidian tool manufacture in Mesoamerica typically focus on workshops located at source areas or at the major sites controlling them. In this paper, we explore production at the periphery, from the Nejapa/Tavela region of Oaxaca located roughly midway between the sources in Central Mexico and those in the Highlands of Guatemala. Rather than the thousands of artifacts representing the byproducts and errors of a single workshop, we are forced to rely upon the handful that found their way into the general archaeological record, as both surface finds and from excavated contexts. The artifacts analyzed for this study include all 643 pieces of obsidian collected during the Nejapa/Tavela Archaeological Project. This relatively small number reflects the scarcity of the raw material, a problem which was largely overcome through careful husbandry. Local artisans learned to recover from manufacturing errors and also to craft thin and narrow blades to prolong the production life of imported cores. Scarcity is also evidenced by the small size of exhausted cores from the region, a possible indication of a handheld blade removal technique.

Worman, F. Scott (Missouri State University) and Anastasia Steffen (Valles Caldera National Preserve)

[87] *Watch Out for Landslides and Gopher Holes! Using Obsidian Hydration to Measure Postdepositional Site Disturbance in the VCNP*

Our study examines the potential for using obsidian hydration analyses to quantify postdepositional site disturbance. The Valles Caldera National Preserve (VCNP) in northern New Mexico encompasses a diverse and dynamic mountainous landscape that people have visited regularly for millennia to access large obsidian quarries and other resources. The result is a rich archaeological record with abundant obsidian artifacts. However that record has been altered, sometimes dramatically, by physical, biological, and cultural processes. We used standard excavation techniques along with detailed pedostratigraphic recording and clast size distribution analysis to begin investigating postdepositional processes at two large multicomponent sites in the VCNP. We then submitted hundreds of pieces of debitage for obsidian hydration analyses. The combined results provide one way to quantify the stratigraphic integrity of deposits at multiple locations at each site. In addition to illustrating the range of postdepositional alterations present, they demonstrate the effects of large-scale landscape factors such as slope and aspect. Moreover, we suggest that obsidian hydration analyses can contribute to effective resource management. Instead of emphasizing protection and/or further investigation of sites with apparently intact stratigraphy, it is possible to quantify the degree to which different locations may yield detailed information about the human past.

Worman, F. Scott [89] see Bruns, Laura

Worthey, Kayla (University of Arizona) and Joaquín Arroyo-Cabrales (Instituto Nacional de Antropología e Historia)

[140] *Gomphotheres, Mastodons, and Mammoths: The Fauna from El Fin del Mundo, Sonora*

El Fin del Mundo, Sonora is the only known site where Clovis artifacts have been found in association with the remains of gomphotheres (*Cuvieronius* sp.), dated to 11,550 ± 60 BP. Analysis of the faunal remains from the site confirms the presence of two juvenile/subadult gomphotheres (*Cuvieronius* sp.) found in close association with Clovis artifacts. A second bone bed located beneath the cultural layer, dated to ≤12,180 ± 40 BP, contains the remains of gomphothere, mastodon, mammoth, horse, and tapir. The co-occurrence of gomphothere, mastodon, and mammoth in the same bone bed is

virtually unknown at any paleontological site other than El Fin del Mundo. Here, the implications of this association of "disharmonious" taxa are discussed in the context of terminal Pleistocene environmental change.

Worthington, Brian [340] see Colten, Roger

Wren, Colin D. [165] see Burke, Ariane

Wright, Aaron (Archaeology Southwest) and Colleen Strawhacker (University of Colorado)

[335] *Probing the Nexus between Hohokam Demography and Agricultural Productivity across the Preclassic/Classic Transition*

The onset of the Hohokam Classic Period witnessed the consolidation of settlements within the major river valleys of southern Arizona, a demographic reorganization that culminated after centuries of regional expansion, population growth, and cultural florescence. In the Salt River Valley, the resultant demographic packing was unprecedented and appears to have promoted environmental degradation, aggravated biological stress, and suppressed birth rates. It has been suggested that communities responded to this increased stress by intensifying their reliance on maize agriculture. We therefore use this paper to explore whether the productivity of farmland was a factor in the demographic processes associated with the Classic Period transition in the Salt River Valley. If so, we suspect populations would have massed in proximity to the most viable farmlands in the valley. To test this, we compare relevant data on soil quality around local platform mounds, the epicenters and hallmarks of Classic Period primary villages across the Hohokam World to those around ball courts, hallmarks of the Preclassic Hohokam World. Because platform mounds were products of considerable labor investment and pillars of community identity, their locations signal places where communities deliberately and strategically chose to either maintain ties or establish new land claims during the Preclassic/Classic transition.

Wright, Alice [4] see Quinn, Colin

Wright, David (Seoul National University), Scott MacEachern (Bowdoin College) and Stanley Ambrose (University of Illinois at Urbana-Champaign)

[161] *Evolution of Iron Age to Modern Landscapes in the Benoué River Valley, Cameroon*

African landscapes have undergone radical ecological transformations since agriculture was introduced and spread across the continent. In some areas, it appears that grassland was encouraged at the expense of forests and woodlands, for agriculture and to provide fodder for livestock. To this point, most of the evidence for such practices has come secondarily from ocean or swamp cores, not directly from archaeological contexts. In this paper, we present a scenario for landscape evolution and ecological conditions during the Iron Age in the Middle Benoué River Valley in northern Cameroon, using data from archaeological sites and surrounding sedimentary and edaphic environments. We evaluate evidence that anthropic mounds were strategically located to simultaneously take advantage of riparian and upland environments. Stable isotope data indicates that portions of the region rapidly transformed from woodland to grassland during the Iron Age, but upland regions were less significantly altered, despite simultaneous archaeological site construction. The introduction of new crops and land management tools over the last 200 years has continued to transform the region's geomorphology and human ecology.

Wright, Joshua (University of Aberdeen)

[25] *Three Cities in the Heartland of the Khitan Liao Empire*

A wide range of Medieval settlement has been identified in the watershed of the Shar mörön river, a territory of grassland and narrow river valleys in the heartland of the nomadic Khitan and their Liao state (907–1125 CE). These settlements range from village landscapes to imperial capitals. This paper will introduce three urban settings of the Liao state: 1) A mercantile center, 2) a local administrative hub, and 3) an imperial capital city along with their immediate hinterlands. Through a synthesis of archaeological survey data, historical accounts and remote sensing we will characterize these cities, lay out some of the central questions in the study of these sites, and describe their forms and place in the larger inhabited landscapes of the Eurasian borderlands. Central questions include, to what extent were they immobile anchors in a landscape of mobile habitation? Elements of a system rigid enclosure for citizens of the empire? Monuments to the power of the Liao empire? Or one phase in a long term history of settlement in this culturally dynamic region?

[25] *Chair*

Wright, Lori (Texas A&M University, Department of Anthropology) and Ethan Grossman (Dept. of Geology and Geophysics, Texas A&M University)

[30] *Reconstructing Ancient Maya Nursing Behavior and Children's Diets at Tikal, Guatemala*

We examine the ancient Maya nursing practices and children's diets at the archaeological metropolis of Tikal, Guatemala, through stable isotopic analysis of permanent teeth in adult skeletons. Stable carbon isotope analysis of tooth enamel permits a measure of the relative amount of carbon from maize foods in the diet, and helps track the introduction of solid foods into the children's diet. Stable oxygen isotopes in tooth enamel reflect the sources of water that children consumed, and shed light on the duration of breastfeeding. By sampling canines, which form between birth and 4.5 years of age, and by measuring isotope ratios on microsamples of enamel from different stages of canine growth, these data bring into focus the nature of dietary change in the first few years of life. Third molars form in later childhood, between 9 and 12 years of age, giving a measure of older childhood diet in the same individuals. Here, we report on the analysis of mandibular canines from 80 Tikal skeletons, and third molars from 48 skeletons. These data provide a means to test hypotheses about differential access to nutritional resources among social groups at Tikal by examining childhood diets and nursing behavior more directly.

Wright, Rita (New York University)

[177] *From Rojdi to Harappa and Beyond: Regional Variation in the Indus Civilization*

Steve Weber's pioneering research on botanical remains and environment has provided foundational studies for subsistence and settlement in the Indus civilization. Results of his field research at Harappa in the Punjab, Rojdi in Gujarat, and Farmana in Haryana focused in three key areas where major Indus centers were established. Differences in archaeobotanical remains provided a firm basis from plant remains and long-term agricultural packages in the three regions. These ranged from multi-cropping strategies that included overlapping plant usage to differences in selection of dominant crops. Although Weber emphasized their environmental differences as selective factors, his emphasis on choice as a major determinant allowed for comparisons between the early remains of the Indus civilization and recent trends in the three regions.

[209] *Chair*

Wu, Mengyang [72] see Osing, Natasha

Wu, Mu-Chun (National Taiwan University)

[208] *Modeling Communities: Social Transformation of Early Kaushi, Taiwan*

This paper presents the modeling of different communities within two sites, Saqacengalj and Aumagan, which exemplifies the early developments of the Kaushi people. In the light of Ingold's "wayfaring theory" (Ingold, 2012), this research argues that interpersonal relationships are not entirely based on social identities, and social relations should also be investigated, regardless of their hierarchical status, but through intimate human interaction. Therefore, this research models human agency from a "meshworked" perspective, and demonstrates how social interactions and relations are influenced through agents walking around a settlement. This bottom-up approach allows the examination of the allocated social relations as opposed to the delegated social identity, and benefits from understanding how different communities interacted. This paper not only highlights the methodological approach of the model, but also presents the changes in settlement pattern as well as the social transformation of early Kaushi people.

[208] *Chair*

Wu, Xiaohong (Peking University)

[26] *Dating the Bronze Artifacts from the Archaeological Sites along the Hexi Corridor*

There are many bronze artifacts found from the sites located along the Hexi Corridor. The radiocarbon dates assigned to the archaeological sites do not always represent the time of the bronze artifacts from the sites. The bronze artifacts can't be dated directly. To get the precise dates of bronze artifacts needs to understand the formation of archaeological sites and the archaeological context of the bronze artifacts with pottery and other datable remains. The good samples for radiocarbon dating are the short-life plant, bone remains and so on unearthed with clear archaeological context of bronze artifacts. Some sites were well excavated in recent years. These made it possible to get the precise dates for the archaeological sites and bronze artifacts. The ages of the bronze artifacts appeared at different locations along the Hexi Corridor will be discussed in this paper.

[26] *Chair*

Wunsch, Mark [77] see Greening, Spencer

Wurster, Bethany (Utah State University), Kate Hughes (Crow Canyon Archaeological Center) and Shanna Diederichs (Crow Canyon Archaeological Center)

[89] *Take a Knap Inside: Evidence for Lithic Activities and Behaviors in Various Pit Structure Types at a Basketmaker III Settlement in Southwest Colorado*

Basketmaker III (AD 500–725) was a period of technological and social change for Ancestral Pueblo peoples of the northern Southwest. Along with population expansion, territorial colonization, and the development of original social institutions, Basketmaker III populations invested in a new technological complex that included fired pottery and dry-land agriculture. Lithic reduction activities are an understudied component of this social and technological complex. Our research captures a range of behaviors associated with lithic reduction and utilization at an aggregated Basketmaker III settlement located in southwest Colorado. The Dillard Site (5MT10647), occupied in the sixth century AD, is comprised of 13 pit structures that include temporary and long-term residences and a rare early Ancestral Pueblo great kiva. By examining and comparing macro- and micro-debitage and tool assemblages found on structure floors, this research demonstrates that the site's occupants patterned their lithic reduction behavior in both public and private spaces. This resulted in specialized production areas, disposal and cleaning behaviors, and a symbolic association with lithic material.

Wyatt, Andrew (Middle Tennessee State University), Cameron S. Griffith (Texas Tech University) and Rebecca Friedel (University of Texas at San Antonio)

[321] *The Archaeobotany of Ritual: The Role of Palm (Arecaceae) in Ancient Maya Caves*

The past several decades of research have identified caves as important loci for precolumbian and historic Maya ritual activity. To the ancient Maya, caves served as portals to the underworld, functioning as sites where ritual practitioners could be in closer contact with important deities and enact rites associated with natural forces. The Belize River Valley has been a significant area for cave exploration and excavation, and Stela Cave in particular, located in the Cayo District in western Belize, has provided a rich source of data for understanding this ritual role of caves. The Maya utilized Stela Cave from the Late Preclassic period through the more recent historic period, and excavations yielded numerous archaeobotanical remains. Among this assemblage we have identified substantial amounts of palm wood (Arecaceae). In this presentation we discuss the archaeobotanical assemblage from Stela Cave, focusing on the role of palm and its importance in precolumbian Maya cave ritual.

[321] *Chair*

Wygall, Brian (Adelphi University)

[140] *Technological Complexities of the Peopling of Eastern Beringia*

Alaska archaeologists continue to disagree on a unified culture history. The primary point of contention surrounds the presence or absence of microblade technology in central Alaska and the meaning of the Nenana and Denali complexes. While some interpret the former as a unique manifestation representing a separate migratory population, others disagree; and, the Denali complex has become a catchall category for a variety of artifact types leading to questions over its conceptual validity. This assessment tests specific questions pertinent to the relationship between prehistoric tool use and ecotones in an attempt to explain the presence or absence of particular artifact types and land use strategies through time. It also reflects on issues caused by repeated occupations, palimpsest assemblages, and other taphonomic processes that influence archaeological consensus. Results indicate separate phases in the initial colonization of Alaska and form a testable hypothesis based on functional land use properties associated with the Denali complex era in a way that distinguishes it from other early technologies in the region. The approach contributes to a long-standing discussion over subjectivity among archaeological categories and explains assemblage variability in eastern Beringia with widespread implications for interpreting the initial peopling of the Americas.

Wygall, Brian [387] see Krasinski, Kathryn

Wylde, Michael (University of Florida)

[358] *The Inca Dogs and Their Ancestors*

The goal of this paper is to elucidate the social role of the dog in ancient Peru as an artifact, a physical manifestation of culture, produced by humans, through archaeological and iconographic interpretation. The large numbers of dogs available for study are a neglected archaeological resource, and one

that can provide a wide variety of information on human life and cultures in ancient Peru. Through the examination of archaeological dog remains and dog iconography from differing temporal and geographic contexts, we can track changes in morphology and use to establish a database following these changes in archaeological contexts and functional differences as well. Through this research I will show that the dog in ancient Peru, through differing temporal and geographic contexts, sometimes inhabited a special place in society, conferring special status on their human owners.

Wyllie, Alison

[65] *Discussant*

Wyllie, Cherra

[391] *Mimesis and Alterity in Classic Veracruz Ceramic Art*

The relief-carved fine paste wares, figurines, and ceramic sculptures of south-central Veracruz exhibit stylistic similarities often attributed to mass production. Yet, there are few molds in the archaeological record, suggesting that replication hinges on the artist's understanding of materials, techniques and canons of representation. Looking beyond the southern Gulf lowlands we see certain affinities between Classic Veracruz ceramic art and that of its Mesoamerican neighbors. Barbara Stark notes that ceramic resemblances can be measured on an ordinal scale distinguishing degrees of copying. Using Stark's metrics of replication, imitation, and adaptation, this paper examines stylistic standardization and emulation both locally and interregionally.

Xi, Qifeng [58] see Chen, Shuxiang

Xia, Yang [30] see Fuller, Benjamin

Xiaohong, Ye and Tang Jigen

[117] *Investigation of Incising Techniques on Jades from the Fuhao Tomb in Yinxu*

During the Shang dynasty the remarkable tradition of working jades extends back to the Neolithic period. However, the duplicate or symmetrical design incised on jades is the major artistic style at that stage. The present study is based on examination of molds of tool marks on several jades unearthed from the Fuhao tomb in Yinxu by scanning electron microscopy. Our observations suggest that rotary incising wheels charged with abrasive (which is called Jieyu sand in ancient China) were used for incising the fine features and handheld tools were still being occasionally used in some details. In addition, no evidence was found for rotary sawing tools on the jades.

Xiaolin, Ren [33] see Storozum, Michael

Xie, Liye (University of Toronto)

[36] *People in Construction: Insights from Ethnographic, Historic, and Archaeological Accounts in China*

Labor recruitment and management are essential to accomplish massive public construction in ancient times, as in today. Archaeologists across the world have examined ethnographic accounts and conducted experiments to understand labor costs and organizational structure for construction and maintenance of large architectural projects. Common conclusions are that the workforce in monument construction during the pre-Iron age could have been easily recruited by non-state level polities. However, past research has overlooked the time pressure of completing the construction within a given period and the challenges from scheduling conflicts with other important activities such as farming. The research presented here examined historic and ethnographic accounts to understand the seasonal availability of laborers and the allocation strategies for laborers in historic China. In addition, the research examined the time frame of public construction and source of laborers at the Erlitou urban center, 1750–1520 BCE. The results will help archaeologists reexamine the labor management strategies in prehistoric China and worldwide.

Xie, Liye [91] see Tsui, Jamie

Xiuhtecutili, Nezahualcoyotl (Tulane University)

[322] *Navigating a Shifting Landscape: Tlaxcallan Trade in the Late Postclassic*

As the political landscape changed continuously in central Mexico during the Late Postclassic, polities of the region had to constantly adjust and adapt, forging new alliances and dispensing old ones. Faced with an increasingly expansive state in the Basin of Mexico, polities in the Puebla-Tlaxcala Valley likewise had to adjust accordingly. Increasingly isolated, Tlaxcallan found alternate ways to integrate into the greater Mesoamerican market system, while resisting political integration in the Triple Alliance sphere of influence. This paper assesses how Postclassic Tlaxcallan maintained this balancing act through an evaluation of ethnohistoric and archaeological evidence about the polity's interaction with its neighbors in central Mexico by considering different models and scales of interaction between Tlaxcallan and its neighbors.

[322] *Chair*

Xiyun, Yu

[33] *Kinship Organization Reflected in Bifurcated Settlements*

The bifurcated settlements of prehistoric China indicate that their internal organization is a reflection of a kind of kinship organization akin to the moieties of South America, the phratries of North America, marriage classes of Australia, and the Xing groups of ancient China. With the emergence of clans, the Xing (姓) group system was transformed to the Zhaomu (昭穆) system.

Xu, Nuo [116] see Li, Yue

Yacobaccio, Hugo [238] see Samec, Celeste

Yadmaa, Tserendagva [27] see Rosen, Arlene

Yahalom-Mack, Naama [193] see Van Horn, Mark

Yakal, Madeleine (University of California, Los Angeles)

[113] *Exotic Beads and Jar Burials: Social Elaboration in the Old Kiyangan Village, Ifugao, Philippines*

Trade and interaction are linked to the development of social ranking among premodern societies, indications for which are seen on mortuary practices, particularly on the existence of exotic burial goods. Our excavations at Old Kiyangan Village (OKV) in the northern Philippine highlands feature in-utero and infant ceramic jar burials with associated grave goods, primarily beads. The investigations reported in this presentation looks at the relationship between both the quality and quantity of the burial beads and the juveniles they were buried with. The varied amounts per grave could indicate an expression of social ranking in Ifugao society as supported by ethnographic studies of current Ifugao social classes and heirloom beads. The presence of Chinese-style glass beads in a Philippine site suggests a network of trade between Ifugao and other Philippine or Asian polities. A comparison of the Ifugao beads to other styles of Philippine and Chinese beads can provide insight on shared cultural processes, craftsmanship, and traditions. In this study we expect to see a pattern of bead quality, quantity, and style related to juvenile jar burials. This analysis will provide a better understanding of Ifugao social practices and how it compares to other Philippine sites.

Yakal, Madeleine [355] see Layco, Wendy

Yamagiwa, Kaishi

[24] *Human Adaptation and Natural Resource Usage in Prehistoric Southern Ryukyu Islands, Southwestern Japan*

This study aims to discuss about the strategy of prehistoric human adaptation to the island environment, especially focus on the natural resource usage. I introduce the case of southern part of Ryukyu islands—the southwestern part of Japan archipelago, where the first long-term human settlement had occurred about 4,300 years ago. Prehistoric people in southern Ryukyu islands had a unique material culture (absence of pottery, use of giant clam shell adzes), which was dissimilar to the surrounding cultural groups, like the Jomon culture of the Japan archipelago or the Neolithic culture, which spread from Taiwan to Southeast Asia. This suggests that the prehistoric southern Ryukyu islands had been generally isolated. On the other hand, their unique material culture may relate to the geological environment of their islands. I suggest that prehistoric people developed a strategy suitable for surviving in these island environments, and improved their own material culture to adapt to a new ecology.

Yamamoto, Naoto (Nagoya University), Kumiko Horikawa (Nagoya University) and Takako Shimohama (Museum of archaeological research of Komatsu City)

[138] *Ethnoarchaeological Analysis of Prehistoric Baskets from Central Japan and Basketry Techniques found at the Museum of Archaeological Research*

Many ancient baskets have been excavated from the wetland sites of the Japan's prehistoric period in the Hokuriku district, Central Japan. Sixty-five baskets have been excavated from 10 prehistoric sites and date from c. 3600 cal BC to c. cal AD 250. Also 14 impressions of basketry were found on the bottom of deep bowls from eight prehistoric sites. Two points are clear from the analysis of these basketry materials: 1) in terms of construction materials, a Inugaya (in Japanese; *Cephalotaxus harringtonia*), a Japanese cedar (*Cryptomeria japonica*), a hiba arborvitae (*Thuja plicata*), a silvertree (*Actinidia*), and a tudurafuji (in Japanese; *Sinomenium acutum*) were used to make basketry. No baskets were made of straw, and 2) regional difference in basket materials plainly existed in prehistoric Japan, bamboos in the Tohoku and Kanto district and plant other than bamboos in the Hokuriku district. We have been using ethnographic basketry to help us understand these ancient basketry examples since these historic baskets were made with Japanese cypress, silvertree, and tudurafuji in the Hokuriku district 30 years ago. Archaeologists, who work at the museum of archaeological research of Komatsu City, have been teaching schoolchildren and the elderly how to make basketry using traditional ancient techniques.

Yan, Qipeng [115] see Zhou, Yawei

Yang, Dongya (Simon Fraser University), Antonia Rodrigues (Simon Fraser University), Anna Marie Prentiss (University of Montana), Eleanor Green (University of Montana) and Camilla Speller (University of York)

[50] *An Archaeological Investigation into the Genetic and Dietary Histories of Dogs at the Bridge River Site, British Columbia*

Domesticated dog (*Canis lupus familiaris*) remains have been recovered from a variety of Northwest Plateau archaeological sites, including Bridge River, a complex hunter-gatherer village on the Fraser River of British Columbia. To gain insight into the genetic continuity and dietary history of these dogs, this study applies ancient DNA techniques to dog bones and coprolites recovered from two pithouses at Bridge River. Dog mitochondrial DNA (mtDNA) is used to inform on genetic relationships between domesticated dogs at Bridge River and other ancient dog populations, both in British Columbia and worldwide. Dog diet information is gleaned from salmon mtDNA sequences recovered from both coprolites and salmon bones within the coprolites. Whole genome analysis, followed by next-generation sequencing on an Illumina MiSeq platform, shed additional light on other dietary components, as well host nuclear DNA from the coprolites.

[116] *Chair*

Yang, Liping (Shaanxi Provincial Institute of Archaeology) and Weilin Wang (Shaanxi Provincial Institute of Archaeology)

[279] *A Middle Yangshao Cemetery of the Yangganzhai Settlement*

In order to better understand the moated settlement of Yangganzhai (ca. 5300–4800 BP) in the Wei River Valley of China, the archaeological team surveyed east of the moated area in 2015. A large number of pit burials with side chambers were found. The cemetery is so far the first known adult cemetery of this period (Miaodigou Phase of Yangshao Culture). Based on C14 dating and funerary goods, the cemetery is contemporaneous with the Yangganzhai settlement. This discovery provides important data for future research on Miaodigou settlement pattern, burial custom, social organization, and relatedness of populations at the time. The side chamber burials of Yangganzhai date to several hundred years earlier than other known burials of this type found in western China. They can therefore provide important archaeological data for further inquiry into this burial type's origins, as well as possible links between the ancient residents of the Wei River Valley and other groups to the west.

Yang, Miaomiao (Shaanxi Provincial Institute of Archaeology), Songmei Hu (Shaanxi Provincial Institute of Archaeology) and Weilin Wang (Shaanxi Provincial Institute of Archaeology)

[279] *Faunal Remains from the Yangganzhai Site*

Over several seasons of excavation, a large quantity of faunal remains have been unearthed from the Yangguanzhai site. These remains were all collected systematically by excavation unit and have been carefully measured and identified by taxon. The analysis of these remains indicates the presence of at least 11 species, including fresh water shellfish (*Unio douglasiae*), pheasant, crane, dog, domestic pig, roe deer, spotted deer, red deer, and cattle. The presence of some of these species suggests that the climate was warmer and damper than in present times in the Gaoling area. The bones of dogs, pigs, and cattle account for 88.89% of the total specimens, and those of pigs are the most abundant. The presence of wild animal remains also suggests that in addition to raising domestic animals, the residents of Yangguanzhai also engaged in hunting activities.

Yang, Yuzhang, Zhijie Cheng, Weiya Li, Ling Yao and Juzhong Zhang

[78] *The Emergence, Development, and Regional Differences of the Mixed Farming of Rice and Millet in the Upper and Middle Huaihe River, China*

In this research, flotation and starch analyses were conducted on samples from eight archaeological sites in the upper and middle HRV. The results indicate that the mixed farming of rice and millet first appeared in the later phase of the middle Neolithic in the regions of the Peiligang Culture, then developed quite rapidly in the late Neolithic (6.8–5.0 ka BP), finally becoming the main subsistence economy at the end of the Neolithic in the upper HRV. However, there are obvious differences in the emergence and development of agriculture between the middle and upper HRV. Rice farming was the only agricultural system during the middle Neolithic, lasting until the end of the Neolithic, when mixed farming appeared in the middle HRV. Furthermore, although mixed farming appeared in both the upper and middle HRV during the end of the Neolithic, the roles of rice, foxtail millet and broomcorn millet in the subsistence economy were not the same. In general, millet was more widely cultivated than rice in the upper HRV, but rice occupied the same or a slightly more prominent position in the middle HRV at the end of the Neolithic.

Yang, Yuzhang [78] see Cheng, Zhijie

Yanicki, Gabriel (Department of Anthropology, University of Alberta)

[339] *Follow the Women: Ceramics and Post-Fremont Ethnogenesis*

The Promontory Gray ceramic type is problematic within the narrative of proto-Apacheans at the Promontory Caves: progenitor populations of Subarctic Dene did not make or use pottery. A solution to this dilemma is readily evident in both oral traditions and genetic studies that show large-scale recruitment of women into founding proto-Apachean populations. Ceramics, normally an aspect of women's craft production, likely arrived with the women who joined them. Early dates for the peak of Promontory Culture occupation, AD 1240–1290, justify a closer comparison of Promontory ceramics to contemporary late Fremont assemblages. Given the potential for culture contact and ensuing processes of ethnogenetic change, a model is presented here to distinguish among ceramic assemblages left by groups that engaged in trade or imitation, or that featured the movement of experts themselves. While some imitative learning is evident, the earliest Promontory Gray specimens demonstrate an already refined ceramic tradition. They are a departure from locally made Great Salt Lake Gray at the nearby Fremont settlement of Choumno Springs, but are often indistinguishable from calcite-tempered Uinta Gray and a highly micaceous type known as Knolls Gray. Two areas—the Uinta Basin and Gunnison Bay—are drawn into sharp focus as loci of proto-Apachean social recruitment.

Yao, Alice (University of Chicago)

[325] *Land Use and Field Ecologies in Southwest China*

This paper complements prevailing studies on prehistoric domestication and agriculture with an eye toward the interrelated problem of land use and food security in south China. In ecologies characterized by monsoonal variability, rugged terrain, and dense vegetation, what are the conditions that challenge or enable the cultivation of a range of staples? Using archaeological, ethnohistorical, and ethnographic data, I examine how extensification of field practices enabled the cultivation of wet/dry crops such as millet, rice, and wheat during the Late Holocene. Management of these inter-cropped fields may have enabled adaptation to climatic variability and addressed long term issues of food security in the tropics.

Yao, Ling [78] see Yang, Yuzhang

Yaquinto, Brian [367] see MacDonald, Sarah

Yasui, Emma (University of Toronto) and Daniel Kwan (University of Toronto)

[33] *Microscopic Leftovers: Exploratory Starch Grain Analysis on Ceramic Vessels from the Shangshan Culture, China.*

This paper will outline trends observed in pottery technology and dietary practices of the early Holocene Shangshan Culture (11,400 to 8400 cal. BP) in the lower Yangtze Valley, China. The Shangshan people produced some of the earliest known fine ware, and it is hypothesized that communities engaged in the low-level production of rice, which began the process of domesticating this crucial cereal. To date, the nature of pottery use and rice consumption at Shangshan sites remains partially understood, but with the application of residue analysis it is possible to examine the microscopic remains of storage and cooking vessels. Therefore, being currently explored, Shangshan pottery technology through the lens of culinary practices and diet using starch grain analysis has proven particularly useful in subsistence studies of poorly or rarely preserved species. In addition to evidence for rice consumption, we are interested in elaborating on the variety of plant species being processed, and if any patterns exist in the use of particular vessel types.

Yates, Donna (Scottish Centre for Crime and Justice Research, University of Glasgow)

[310] *Discussant*

[310] *Chair*

Yates, Phoebe

[234] *The Ottoman Rule of Athens and How it Shaped the Topography of the Acropolis*

This poster will discuss the topographical changes of the Athenian Acropolis and how it affected the city's identity. The Acropolis is an iconic monument defining Athens as a city. It was erected in Preclassical times, and has been the center of religious festivals and the city itself ever since. In 1453 the Ottoman Turks conquered Athens and made it their own. Most monuments, including the Acropolis, were altered to fit the Turkish lifestyle, giving the monuments a different function than the glorified Classical period. This was horrific for the Athenians because they viewed the Classical times as a Golden era, and did not want to see it fade. All churches were turned into mosques, Turks became neighbors to Athenians, and most importantly, Christians were not allowed on the Acropolis. Today, tourists can visit the Acropolis and see the changes made during the Turkish rule. The easiest to

spot is the caved-in roof and destroyed wall of the Parthenon. Due to its significant influence on the city, I've chosen to focus on the three main monuments on the Acropolis; the Parthenon, the Erechtheion, and the Propylaea. I will discuss the changes made and how the effects were felt throughout Athens.

Yduarte, Martha [368] see Ferguson, Jeffrey R.

Yellen, John (National Science Foundation)

[70] *The Framework for National Science Foundation Funding of Archaeological Research*

National Science Foundation funding for archaeological research is driven by several factors some internal and others external to NSF. The Foundation is an agency of the federal government and the amount of money authorized for expenditure and strictures on how it is to be allocated is determined by a multifaceted process which involves the Foundation itself, the President and multiple House and Senate congressional committees. Thus for each annual budget appropriation cycle, uncertainty is involved. The Foundation itself has then considerable leeway in the competitions held and the amounts allocated to individual Programs. While archaeology receives support through multiple sources within NSF the Archaeology Program constitutes the focal point and data indicate a stable funding base over many years. If the past is any predictor of the future, one might expect the pattern to continue. NSF criteria require proposal evaluation to take into account both "intellectual merit" and "broader impacts," the latter of which is defined as "benefit society or advance desired social outcomes." The hope is that the current framework is both well enough established and appropriately designed for a stable future.

Yépez Álvarez, Willy [170] see Bautista, Stefanie

Yépez Álvarez, Willy [233] see Gonzalez-Macqueen, Felipe

Yerka, Stephen (University of Tennessee)

[195] *The Current State of the Digital Index of North American Archaeology (DINAA)*

The Digital Index of North American Archaeology (DINAA) is expanding from its initial proof-of-concept phase, scaling to a truly continental effort. As a linked open data hub for information related to archaeological sites, DINAA interoperates governmental, research, and archival information sets about hundreds of thousands of archaeological sites. Although DINAA links archaeological information at a scale that was not feasible even a decade ago, its greater strengths come from a commitment to open data and open-source ethics, collaboration, and multi-stakeholder partnerships. DINAA's loose coupling of networked information forms an index through which archaeological researchers as well as the public can communicate and query disciplinary knowledge about the past, making archived data, physical collections, and documentation more readily discoverable through spatial, temporal, and cultural contexts. The project also aims to support the heritage management efforts of sovereign Tribal and other government officials. This poster reports on the current state of DINAA, highlighting current work supported by both the Institute for Museum and Library Services (IMLS) and the National Science Foundation (NSF). The poster illustrates methods to network archaeological data on a continental scale, and highlights some of the successes in building a database "by community" instead of "by committee."

[195] *Chair*

Yerka, Stephen [75] see Hegge, Oliver

Yerkes, Richard (Ohio State University), Attila Gyucha (Field Museum, Chicago, USA) and William Parkinson (Field Museum, Chicago, USA)

[178] *Social Dynamics and Archaeological Sciences at Neolithic Tells: Investigations on the Great Hungarian Plain by the Körös Regional Archaeological Project*

Investigation of social dynamics at Neolithic tells, Szeghalom-Kovácsalom and Vésztő-Mágor, Hungary, included surface collection, geophysical and geochemical surveys, targeted excavations, micromorphology, stable isotope studies, compositional analysis, and contextual analysis of 14C dates, cultural materials, and burials. Both sites were established ca. 5200 BC, cal., and they are located on the same branch of the Sebes-Körös River, seven km apart. However, they have different dimensions and settlement layouts. At Szeghalom-Kovácsalom a 60 ha nucleated settlement complex surrounds a small tell. The larger Vésztő-Mágor tell was enclosed by encircling ditches, but there is no adjacent flat settlement. Spatial analysis using GIS documented rapid horizontal settlement expansion ca. 4800 BC, cal., while micromorphological studies and calibrated 14C dates revealed rapid vertical growth at both tells. Archaeometric and contextual analysis provided vital data used to examine the archaeological correlates of social complexity. There was some evidence for social differentiation and for ritual activities led by emerging elites. However, this first occurrence of population nucleation did not lead to institutionalized hereditary inequality and powerful rulers at the tells. On the Great Hungarian Plain, this occurred during the Bronze Age. Nonetheless, population nucleation did contribute to the emergence of new ideas about sociopolitical organization.

[264] *Discussant*

Yeshurun, Reuven (University of Haifa) and Melinda Zeder (Smithsonian Institution)

[340] *Fox Overabundance and Human Response in the Earliest Villages of the Near East*

Ethological and ecological studies point to the proliferation of small mammalian carnivores, most notably red fox (*Vulpes vulpes*), in human-modified environments. Foxes prey on human trash and consequently their populations in and around settlements are denser, their survival rate is improved and their foraging territories contract, centering on refuse dumps. This carnivore overabundance leads to a series of effects on the local ecosystems. The foxes' strong commensal relationship with humans highlights the unintentional but highly effective alteration of the ecosystem by human communities. Here we investigate archaeologically when and how the impact of human settlement refuse started to significantly affect the local fox populations. We also examine humans' response to this phenomenon. Fox overabundance and commensalism are evident as early as the first permanent hunter-gatherer settlements appear in the Near East, ca. 15,000 years ago, preceding the appearance of agricultural villages. We demonstrate that, consequently, humans habitually used foxes as resource. Thus, terminal Pleistocene and early Holocene hunter-gatherers unintentionally created an overabundance of foxes and then managed to use this side effect of sedentism to their favor, by including foxes in their broadening subsistence base.

Yeshurun, Reuven [332] see Nadel, Dani

Yeske, Kate

[47] Alaskan Game Drives: An Architectural Assessment

Ethnographic accounts of communal hunting activities in Alaska are abundant, yet archaeological evidence of this practice is scarce. The inuksuit—elaborate stacked rock cairns—that demarcate many game drives in Alaska provide evidence of these important traditional subsistence strategies. Improved documentation of these features will facilitate a better understanding of not only their function but their meaning to the original builders and implementers of game drive systems. Comprehensive investigation of game drive sites and spatial analyses of their features point to patterns that reflect local landscape use and broader regional trends.

Yesner, David [194] see Wells, Joanna

Ying, Wang [25] see Dong, XinLin

Yoko, Sugiura [145] see Jaimes Vences, Gustavo

Yoneda, Minoru [358] see Takigami, Mai

Yoshida, Kunio [332] see Kato, Hirofumi

You, Yue [116] see Li, Yue

Young, Eric E. (Arcadia University)**[14] Further Defining the Role of the Forensic Archaeologist**

As the use of archaeologists in forensic matters grows, it is important to define the role the archaeologist ought to play in such situations. Archaeologists should educate law enforcement personnel as to their utility in investigations. It is important that archaeologists understand their usefulness in criminal matters, and even more importantly, archaeologists should understand their limitations in investigations. There is a need to establish guidelines as to what archaeologists should/should not do while involved in criminal cases. It is also important to attempt to separate the roles of the forensic archaeologist and the forensic anthropologist. It appears that many, including practitioners in both fields, do not know where to limit the roles of each. A discussion of these matters will further the progression of the field of forensic archaeology.

Younie, Angela (Far Western Anthropological Research Group), Jack Meyer (Far Western Anthropological Research Group) and Brian Byrd (Far Western Anthropological Research Group)**[294] Mound-Building, Site Structure, and Land-Use Patterns in the Sacramento-San Joaquin River Delta**

Mound sites are a notable characteristic of mid- to late-Holocene occupation throughout the Central California. Most recent archaeological research on the region's mounds has focused on the their dense clustering along the San Francisco Bay margins; in contrast, much less attention has been focused on the mounds of the adjacent Sacramento-San Joaquin River Delta. Although often grouped together, few systematic studies have been undertaken to evaluate differing site patterning, the structure of mortuary practices versus residential activities, and the impact of local landscape features on the distribution and visibility of mounded middens. Mounds along the San Francisco Bay are often considered to occur in clusters complete with densely-deposited shell and earth middens, non-mounded cemeteries, and petroglyphs. Although of a similar age, mound sites in the productive but otherwise marshy mosaic of streams and wetlands in the Delta region appear to have differing structural signatures. Naturally formed relict sand dunes provided viable dry land for habitation and were repeatedly occupied over time. Though geoarchaeological modeling and exploration of site structure, our research focuses on the Hotchkiss cluster of dune-mounds in the South Delta, and then applies these results to a broader consideration of dune-mound patterning throughout the Delta.

[294] Chair

Younie, Angela [252] see Sattler, Robert

Yu, Chong (Sun Yat-sen University)**[116] Study on the Subsistence of Neolithic and Early Bronze Age China Using Published Mammal Records**

This research is based on all published zooarchaeological study on Chinese Neolithic and Early Neolithic sites and mainly focuses on the animal subsistence economy in the same period. With the advent of quantitative analysis, refined models can now be built and analyzed from all the published data. The application of big data studies on animal remains provided information of range and relative importance of taxa and their possible change through time-scale and region which may reflect an ancient environment around sites, subsistence economy of ancient people as well as consumption patterns within sites which can be used to evaluate the relative importance of animals in the diets obtained through various subsistence strategies. At the same time, animal origins and dispersal can also be traced, which may help to understand the antiquity of changes related to domestication.

Yu, Pei-Lin (Boise State University)**[208] Behavioral Ecology of Neolithic Transformations in Taiwan: Ceramics and Settlements**

Six thousand years ago, encounters between Paleolithic Taiwanese foragers and seafaring farmers of Mainland China ushered in a new agricultural lifeway. Two hallmarks of the early Taiwanese Neolithic are sedentary settlements and red cord-marked ceramic wares. How quickly did foragers adopt these cultural traits? Did they adopt them together or separately? Archaeological data from the Neolithic transition are scarce, but ethnographic information suggests that the rate of change is affected by considerations of costs and benefits compared to the existing lifeway. This paper uses projections from Lewis Binford's Hunter-Gatherer database to offers hypothetical predictions for mobility and subsistence of Taiwan's Paleolithic foragers, and the tempo and mode of adoption of ceramic technology and sedentized living.

[208] Chair

Yu, Pei-Lin [50] see Ryan, Ethan

Yuan, Jing (Institute of Archaeology, Chinese Academy of Social Sciences, Beijing, China)

[116] *Chair*

Yuan, Jing [116] see Zhao, Xin

Yue, Hongbin [72] see Ledin, Lauren

Zaburlin, Maria Amalia [222] see Albeck, María

Zalaquett, Francisca

[347] *Sounds in Context: Musical Instruments from Teotihuacán*

In this paper we present the advances in the organological, acoustic and contextual analysis of musical instruments excavated by Dr. Linda Manzanilla in the sectors of Teopancázco, Oztoyahualco, Tunnels, and Xalla, all of them located in the archaeological site of Teotihuacán. These instruments were part of a complex system of sound communication that often accompanied the rituals and daily activities. We propose some interpretations on the use of certain instruments and their relationship with other materials excavated in the same context.

Zalaquett Rock, Francisca [349] see Domínguez, María del

Zambrana, Jorge [326] see Miranda Tapia, Ivonne

Zambrano Anaya, Raúl [230] see Núñez Aparcana, Bryan

Zangrando, Atilio, Augusto Tessone (INGEIS-CONICET, Pabellón INGEIS, Ciudad Universita), Angélica Tivoli (CADIC-CONICET), Jonathan Nye (University of California, Merced.) and Suray Perez (Facultad de Filosofía y Letras, Universidad de Bue)

[284] *Subsistence Variations and Landscape Use of Marine Foragers in Southern South America: New Perspectives from an Isotopic Zooarchaeology*

Predictions based on resource distribution and abundance throughout patches (i.e., patch choice model) are critical to model human-specific decisions. However, information about past abundance or distribution of preys is rare, and archaeological evaluations are normally based on modern ecological parameters. This procedure can face some problems since species distributions are likely to have fluctuated along time as a consequence of different environmental factors, or as the product of human predation. Stable isotope studies have the potential to address this problem providing a suitable paleoecological framework. We present and discuss stable isotope analyses from zooarchaeological samples of coastal and marine resources dated to the past 6,000 years with the aim to investigate possible variations in the patch use by marine hunter-gatherers in southern South America. A number of studies have suggested that variations in carbon and nitrogen values among marine animals can be explained by differences in the isotope composition between nearshore and offshore ecosystems, or by changes in trophic levels. Since stable isotope analyses are used here as paleoecological markers for assessing the distribution of animal resources in the past, this method allows us to identify the use of marine patches for foraging activities by hunter-gatherers along the Holocene.

Zanotto, Hannah [335] see Craig, Douglas

Zaragoza, Diana (INAH) and Kim Richter (Getty Research Institute, Los Angeles)

[135] *Precolumbian Huastec Metallurgy*

Although the Huasteca may have had an important role in the emergence and development of metallurgy in Precolumbian Mesoamerica, little has been published, apart from Dorothy Hosler and Guy Stresser-Péan's short study on Huastec metallurgy (1992). They proposed that the Huasteca was second earliest region in Mesoamerica after West Mexico to produce bronze alloys artifacts during the Postclassic period. Their research positions the Huasteca as an early adopter and innovator of this technology. We follow up on this early important research by reviewing the known corpus of metal artifacts from the Huasteca ranging from copper alloys, silver, and gold objects and by investigating the possible relationship between the Huasteca and mining centers, such as Guadalcázar, and other metal-working regions, such as Guerrero and the American Southeast to identify patterns of technological exchange. We also analyze the representations of Huastec metal objects in precolumbian and Early Colonial artworks to illustrate how metal objects were used and to gain insight into stylistic interchange between the Huasteca and other parts of Mesoamerica. We argue that the analysis of Huastec metal objects confirms that the region was deeply integrated in Mesoamerican exchange networks and that it developed local technical and artistic innovations in metal.

Zarger, Rebecca (University of South Florida) and Kristina Baines (Guttman College, CUNY)

[162] *Perceptions of Changing Landscape Mosaics in Southern Belize*

What drives human uncertainty when confronting gradual change versus catastrophic, rapid change? Based on longitudinal ethnographic data that includes household behavioral observations, oral histories and structured survey interviews of land use change, and continuous participant observation data, we describe the ways farming families in southern Belize have responded to changing environments over time, within the context of a mosaic of livelihood strategies. Ethnographic interviews with community members focused on their perceptions of environmental change over their lifetimes and responses to agricultural uncertainty from drought, hurricanes, or other events. These are juxtaposed with ongoing political conflict with nation state and other actors over heritage and identity, territory, and misperceptions of land use practices since the 1980s in southern Belize. We consider the following questions in our paper: How did Maya farmers, their institutions, and the landscape itself respond to a changing environment? What does this suggest about future resilience in the face of predicted future climate changes?

Zaro, Gregory (University of Maine), Martina Celhar (University of Zadar), Kenneth Nystrom (State University of New York at New Paltz), Dario Vujevic (University of Zadar) and Karla Gusar (University of Zadar)

[282] From Liburnian to Ottoman: Unraveling Settlement History at Nadin-Gradina, Croatia

Ancient cityscapes with long occupational histories have great potential for reconstructing changes in social structure, spatial planning, political governance, identity, economy, environment, and climate. Recovering such information, however, poses many challenges, both human and financial. Archaeological deposits are often deeply buried and palimpsestic, representing a complex mixture of processes including collapse, partial abandonment, repurposing, and reoccupation. Yet, anthropological inquiry into human societal organization and its coevolution with the physical world demands that archaeologists sort out occupational history and changes in the built environment with some degree of chronological precision. Such are the challenges, and opportunities, at the Nadin-Gradina archaeological site in coastal Croatia, where ongoing fieldwork is beginning to define the temporal parameters of its construction and evolution over the course of approximately 2,500 years—from a Liburnian hill fort in the first millennium BCE to an Ottoman frontier settlement in the sixteenth and seventeenth centuries. The results permit a series of more robust anthropological questions related to human response and adaptation to urbanization, landscape change, and climate over a span of centuries to millennia, while also opening the door to questions of cultural identity, colonization, and migration.

Zaro, Gregory [53] see Countryman, James

Zarrillo, Sonia (University of Calgary)**[270] The Secret Life of Cacao in the Ecuadorian Upper Amazon**

Genetic studies suggest that cacao (*Theobroma cacao* L.) domestication occurred in the Upper Amazon of southeastern Ecuador and northeastern Peru and was then transported by humans northward to Central America and Mexico. As such, we should expect to find the earliest archaeological evidence of cacao use in the tropical forests of South America. This paper presents starch granule evidence for the early use of cacao from the Upper Amazon site of Santa Ana-La Florida during the Ecuadorian Early Formative Period.

Zatorski, Jezelle (Stantec Consulting Ltd.) and Keli Watson (Crossroads CRM)**[387] Living Landscapes and Moving Cultures**

Culturally Modified Trees (CMTs) in the Central Interior of British Columbia are well-known and extensively documented. While there are several types of CMTs, the most common in the interior, by far, are barked stripped Lodgepole Pine for the purpose of cambium collection as a food resource. The majority of the discussion and analysis of CMTs is field-based and primarily focuses on scar identification to determine cultural origin, dating methods, mapping and describing locales where large numbers of CMTs are found in mass quantity. What has been lacking is an attempt to consider these CMT sites as an integral part of the cultural landscape of Central Interior First Nations. In this paper we will explore the potential use of geospatial data to examine CMT sites in terms of regional distribution and land use patterns. The Carrier Nations in the Central Interior of British Columbia are known to have followed a seasonal round, focusing on different resources in different parts of their landscape at different times of the year. Cambium collection is an important, and overlooked, part of their holistic interaction and understanding of their surrounding landscape.

Zavala, Bridget M. (Universidad Juarez del Estado de Durango)**[352] Searching for the Big House: Ritual Spaces of the Sextin Valley, Durango, Mexico**

Many archaeologists have recorded plazas, altars, and rock art in Durango's prehispanic landscapes. These spaces are often characterized as settings for ritual activities. Nevertheless, few researchers have posited the kinds of activities that were carried out in these spaces. In this paper I analyze data from excavation of the sites of Corral de Piedra and Los Berros in the Sextin valley in northern Durango, Mexico. The materials, architecture and spatial distribution suggest a variety of different ritual actions that made these spaces meaningful to the agents that built these locales. I consider recent ethnographic work among contemporary groups in the region to illustrate the modern-day use of analogous spaces in search for meaningful interpretations of specialized features in the precolumbian past.

[352] Chair

Zavaleta, Enrique [170] see Uceda, Santiago

Zavadny, Emily (Penn State University) and Sarah B. McClure (Penn State University)**[284] The Cultural Ecology of Croatia's Cattle: Stable Isotope and Zooarchaeological Analyses of an Indigenous Breed**

Here we present results from a preliminary stable isotope and zooarchaeology study of cattle from the Lika region of northern Croatia. During routine investigation of Bronze and Iron Age faunal assemblages, we identified bones belonging to a small unspecified cattle breed. These same specimens also have unexpected stable carbon and nitrogen isotope signatures, and are more similar to both domesticated and wild browsers than grazing cattle in other regions. We argue that these adaptations were exploited and encouraged by local populations, who adopted these cattle as part of a larger economic strategy tailored to the harsh and unpredictable environment of Lika. We conclude with a brief overview of the modern buša cattle, the most likely successor to our specimens and a heritage breed that is still raised in Lika today.

Zawadzka, Dagmara (Université du Québec à Montréal [UQAM])**[28] Embodiment in Animic Rock Art: An Example from the Canadian Shield**

Perceptions of self and of personhood are fluid within animic ontologies that tend to stress spiritual similarities between humans and nonhumans. This fluidity is reflected in concepts of bodies. Bodies endow their owners with particular qualities, perceptual skills, behaviors and ultimately, identities. Beings can transform their bodily appearance, therefore what is perceived by an onlooker does not necessarily correspond to the being that is perceived. In the Canadian Shield, depictions of anthropomorphic bodies range from simple schematic stick figures to elaborate idiosyncratic images where clothing and facial features are indicated. Bodies are also evoked in images of heads, hands and probable vulvas. In this paper I will attempt to shed light on how embodiment was enmeshed within rock art by looking at bodily experiences depicted in rock art; at the effects that rock art could have had on living bodies; and at the importance of the kinetic process of creating rock art for upholding relationships with other-than-human persons. The experiences and motivations that led to the creation of rock art, as well as the process itself, ultimately reveal the agency of rock art.

Zawadzka, Dagmara [175] see Gagnon, François

Zazula, Grant [47] see Graf, Kelly

Zborover, Danny (Institute for Field Research)**[137]** *Two Figurines and a Conquest: Toltec and Aztec Warriors in the Sierra Sur of Oaxaca?*

In this talk I will present a contextual and iconographic analysis of two unusual, yet almost identical, figurines of lavishly dressed warriors, reported from different sites in the Chontal Highlands of Oaxaca. While variations on mold-made solid figurines of armed individuals were common in Late Classic Oaxaca, the particular attributes of these figurines are more analogous to militaristic iconography emerging from Postclassic Central Mexico. Taking the figurines' iconography and regional historical documents as a point of departure, I will evaluate possible scenarios for both Toltec and Aztec geopolitical interventions in the region. Finally, I will argue that these new data paint the eastern Sierra Sur not as the geographical obstacle it may have appeared in the recent past, but rather as a highly-traveled and coveted bridge between the Isthmus, the highlands, and the coastal regions of southern Mexico.

Zborover, Danny [70] see Boytner, Ran

Zeballos, Carlos [371] see Gillam, Christopher

Zedeño, Maria Nieves (University of Arizona)**[286]** *Cooperation and Order among Communal Bison Hunters*

This paper discusses the trajectories and intersections of cooperative practices and ordering strategies among prehistoric communal bison hunters. Utilizing the vast and ancient record of bison hunting in the region and particularly in Montana, the paper specifically focuses on the rise of large-scale bison harvests in the northwestern Plains of North America, and the effect of hunting technology on social cooperation at various scales (kin, band, supra-band). As well, the paper delves on the institution of strategies for managing the success of surplus production for consumption, storage, and exchange. The equally vast historic and ethnographic records of bison hunters in the region are tapped to unpack the role of gender in the structure of individual, kin, and non-kin cooperative practices and ordering strategies along the economic, ritual, and political realms of social life.

Zeder, Melinda [340] see Yeshurun, Reuven

Zegarra, Edward (Binghamton University)**[359]** *Archaeological Ethnography for a Decolonizing Methodology in the Central Highlands of Peru*

Ethnographic research is herein demonstrated to contribute a crucially important initial step in the reconstruction of indigenous histories and to building a praxis of collaborative archaeology. Ethnographic research was conducted during two field seasons in 2015 and 2016 in and around the sprawling ruins of the capital city of the Wari Empire in the central highlands of Peru to reach an understanding of the contemporary cultural idiosyncrasies pertinent to the Peruvian historical context. Collaborative archaeology has made great strides to address issues of the colonial embeddedness of archaeology, the decolonization of our discipline, and the social integration of descendant communities in prehistoric cultural research in the recent past. As a result, the discipline of archaeology has begun to adopt research methods that integrate native populations at every stage of the research in order to address these differences that split history into two parts in settler nations. However, multi-scalar ethnographic research prior to attempting collaborative ventures have not yet been fully adopted by most researchers and it is the purpose of this presentation to demonstrate their validity and relevancy to establishing mutually beneficial, rather than need- or guilt- based, relationships for the protection and preservation of archaeological sites.

Zegarra Zegarra, Michiel [308] see Gorman, Alicia

Zeidler, James A. (Colorado State University)**[384]** *Animal Imagery and the Mythic Level of Jama-Coaque Figural Style*

The mythological and iconographic analyses of Peter G. Roe have made seminal contributions to our understanding of Amerindian cosmology and religious thought in South America, both in the ethnographic present and in the prehispanic past. His unitary mythic model set forth in the *Cosmic Zygote* (1982) and explored in subsequent publications has convincingly demonstrated that this quintessentially Amazonian model has "deep-time" attributes that shed interpretive light on iconographic representations expressed in prehispanic Central Andean cultures such as Chavín and Moche. Less certain is its applicability to ceramic figural styles and iconographic representations found in post-Formative coastal Ecuadorian cultures such as Jama-Coaque where a particularly rich assemblage of human, plant, and animal imagery is found, albeit from looted artifacts now curated in national museums. This paper explores the iconographic interpretations of Andrés Gutiérrez Usillos (2011) in his impressive compendium of Jama-Coaque figural sculpture from the Banco Central museum collections entitled *El Eje del Universo: Chamanes, sacerdotes y religiosidad en la cultura Jama Coaque del Ecuador Prehispánico*. Roe's mythic model is then brought to bear on this body of work to determine whether the model can provide an alternative interpretation of these Jama-Coaque "gods and mythic beings" expressed in ceramic sculpture.

[148] *Discussant*

Zelevnik, W. Scott [80] see Reed, David

Zender, Marc (Tulane University)**[5]** *A Diachronic Interdisciplinary View of Maya Foodways*

This paper reviews archaeological, iconographic, epigraphic, and linguistic evidence for Maya foodways, documenting both the remarkable stability of some traditions and the equally significant changes in others, mostly due to cultural contact, civilizational rupture, and generational shift during some two millennia of Maya history. Although hardly a frequent topic of Maya monumentality, with a few notable exceptions, numerous ceramic vessels, murals, and graffiti depict and/or hieroglyphically reference Classic comestibles and beverages, and modern Mayan languages share numerous terms for these items, suggesting a long antiquity for various foods and drinks. Similarly, archaeologists have long documented the instruments and places of consumption, and have had surprising success in recent years in the direct chemical identification of ancient foodstuffs. Less clear has been the social settings for which various foods were considered appropriate: legacies of several periods of contact with Central Mexican culinary traditions (in the Early Classic and Postclassic periods), and the wholesale transformation of the royal court and its cuisine in the wake of a disastrous early ninth century civilizational collapse. And yet, surprising details about the dynamic social and political roles of food emerge if one takes a diachronic view informed by evidence from several distinct but complementary disciplines.

Zeng, Lingyi (Yale University)

[213] EDXRF Analysis on Ceramics during the Mongol Period in China

In this paper I will present the results from analyzing and comparing ceramics from multiple contexts, including ceramic production centers, burials and residential areas during the Mongol period. I adopted Energy-Dispersive X-ray fluorescence (EDXRF), a very effective and nondestructive way to analyze the chemical compositions of their pastes, glazes and pigments of samples from Jingdezhen, Inner Mongolia, and other areas of the Mongol Empire. Other scientific techniques and statistic methods also applied to analyze the provenances of them and to distinguish the official wares from wares intended for commercial use. My research not only focused on how objects were produced, consumed and exchanged, but also attempted to understand the underlying sociopolitical factors that affected these processes over time and space, which I believe will contribute to the understanding of this multiethnic society.

Zeng, Wen [115] see Zhao, Yongsheng

Zhai, Shaodong (Institute of Archaeology, Chinese Academy of Social Sciences)**[36] From a Strategic Passage to a Remote Town: The Status Change of Dunhuang in the History of China and West Communication Reflected from the Beacon Ruins in Dunhuang**

Silk Road played an important role in the ancient China and West communication. Dunhuang is located in the most western part of the Hexi Corridor, which is a valley between Qilian Mountain and Beishan Mountain. It connects the countries of the Middle Asia, Europe and Africa in west and the East Asia in East. Beacon ruin is the most important type among the archaeological ruins, and played a key role in protecting the Northwest frontier and the Silk Road accessibility. Among the 182 ruins of Dunhuang found in the third cultural relics general investigation in China, there are 76 beacon ruins (some were used in multi-dynasties), including 44 beacon ruins dated to Han Dynasty, 15 dated to Jin, and 18 dated to Qing. The different beacon ruins number reflects the status change of Dunhuang in the History of China and West communication.

Zhang, Dongju (Lanzhou University), Guanghui Dong (Lanzhou University), Qianqian Wang (Qinghai Provincial Institute of Cultural Relics an), Xiaoyan Ren (Qinghai Provincial Institute of Cultural Relics an) and Fahu Chen (Lanzhou University)**[78] Prehistoric Human Adaptation to Tibetan Plateau Environment Indicated by 151 site in the Qinghai Lake Basin**

Current study indicates that Northeastern Tibetan Plateau (NETP) is one of the first widely occupied places by prehistoric people on the Tibetan Plateau. This makes NETP very important to understand the human history on the plateau and human adaptation to high elevation environment. Hence, 151 site, a paleo- to Epi-Paleolithic site in the Qinghai Lake basin on NETP, was chosen to excavate. Thousands pieces of animal bones, hundreds pieces of stone artifacts and several possible hearths were unearthed and obtained during two excavation seasons. Carefully redating of the site shows that it was first occupied shortly around 15 ka BP, then reoccupied from 9000–6000 BP more intensely. Preliminary study of the site suggests that the first appearance of human in Qinghai Lake basin is closely related to the amelioration of the Last Deglaciation and the prevalence of microlithic technology in North China, which may enlighten the study of early human migration on to whole plateau.

Zhang, Guowen (Department of Archaeology and Museology, Nankai University)**[117] Carbon and Nitrogen Isotopic Analysis on Human and Animal Bones of Nanwa Site, Henan Province, China**

The Nanwa site (1680 BC) Song Dynasty; located in Dengfeng city, Henan Province, China, provided a valuable opportunity for the Xia Dynasty and the Chinese civilization investigation. We could provide effective evidence for the food resources utilize pattern and agricultural economy development. Stable isotopic carbon, nitrogen analysis of 14 animals and 22 human bone collagen from the Nanwa site indicated that, wild animals (–19.9‰, 4.4‰, n = 1) have a C3-based terrestrial diet. Domesticated pigs (–7.6±0.6‰, 6.6±0.4‰, n = 7) have a diet of predominated C4-based foods, as well as the sheep (–6.9‰, 6.2‰, n = 1), cattle (–9.0‰, 7.8‰, n = 1), and dog (–6.6±0.5‰, 6.9±0.3‰, n = 2), which is likely obtained from human feeding. The $\delta^{13}C$ and $\delta^{15}N$ value of the human from the Erlitou, Later Shang and to spring and autumn period is –12.1±4.1‰, –11.6±1.3‰, –7.5±4.9‰ and 5.5±1.3‰, 6.8±0.3‰, 6.8±0.9‰, indicated that they mainly relied on C4 foods, probably millet or few animals fed on C4 plants. We also found that the Nanwa of the Erlitou to Late Shang Dynasty had consumed few C3 foods, which indicated a mixed agricultural economy, probably supplied by rice, beans, and wheat. Compared to other archaeological culture people, the Nanwa had a different animal husbandry and agricultural economy pattern.

Zhang, Hua (Simon Fraser University)**[115] Osteoarthritis, Labor Division, and Occupational Specialization of the Late Shang China: Insights from Yinxu (ca. 1250–1046 BC)**

This study investigates the prevalence of osteoarthritis of commoners at Yinxu, the last capital of the Late Shang dynasty (ca. 1250–1046 BC), to study lifeways and stress of early urban populations in ancient China. A total of 197 adult skeletal human remains from five sites were analyzed to examine eight joints of upper and lower limbs in addition to three indicators of spinal osseous changes. The clear sex difference of elevated osteoarthritis prevalence in males indicates a strong gender division of labor. In addition, the distinctive osteoarthritis pattern of higher upper limb/body osteoarthritis reveals possible occupational specialization that involves repetitive lifting and carrying heavy-weight objects. When archaeological contexts are incorporated, the skeletal population from the Xiaomintun site with this distinctive pattern can be identified as a bronze-casting artisan group. Relatively higher osteoarthritis of the Xiaomintun females (when compared with nonspecialist females) may also suggest that those women might also have participated in bronze-casting workshop activities. Such a family-involved occupation, if it existed, may have contributed to the establishment of lineage-based and occupation-oriented neighborhoods as proposed by many Shang archaeologists.

[115] Chair**Zhang, Jian (History School-Zhengzhou University & East Asian Studies-University of Toronto), Chen Shen (Royal Ontario Museum, Canada) and Songan Jin (History School of Zhengzhou University, China)****[78] New Archaeological Evidence of Prehistoric Cultural Interactions in the Middle of Han River Valley, Central China**

During 2007–2009, the Gouwan Site in Xichuan County, Henan province, was excavated by archaeologists from Department of Archaeology, Zhengzhou University. Located in the middle of Han River valley, the site represents prehistoric cultural manifestations of Yangshao, Qujialing, Shijiahe and Wangwan III in their four developmental sequences although remains of the earliest Yangshao are the most abundant. While the Yangshao and Wangwan III were part of north cultural system in the Central Plains, Qujialing and Shijiahe Culture were of the South China cultural representations. The important part of this archaeological discovery is to have different cultural elements from both north and south regions at the Gouwan site. Furthermore, trenched settlement of Yangshao in middle Han River valley was identified at the site for the first time. This feature, along data resulted from other relatively clear spatial analyses provided a case study of regional micro settlement patterns and their social changes. Therefore, these new data derived from the Gouwan site provide new archaeological evidence of prehistoric cultural interactions in the middle of Han River valley.

Zhang, Jinglei [30] see Fuller, Benjamin

Zhang, Lei**[133]** *A Brief Analysis of the Evolution of Bird Design in Ancient Chinese Head-Ware*

The bird design, as a distinctive and time-honored decoration in the Chinese culture, has its unique national forms and artistic glamour, which had also condensed and accumulated rich and profound connotations. Being an indispensable part of the ancient Chinese civilization, the head-ware of ancient Chinese women had evolved continuously in the transmission of cultural heritage. Which, reflecting not only the changes in people's aesthetics, but more importantly, the ever-developing ideology and culture along the various historical periods through the lens of plastic arts. The bird design, an important graphic pattern used in the head-ware of ancient Chinese women, has significant meaning embedded in its changes and evolution as a representative case.

Zhang, Li (Zhengzhou University)**[72]** *The Landscape of China's Participation in the Bronze Age Eurasian Network*

In the last decade, much has been learned about the network of interactions in Bronze Age Eurasia, and the importance of the steppe pastoralists in the creation of this network. However, the mechanisms that enabled societies in ancient China (both those bordering on and distant from the steppe) to participate in the Bronze Age Eurasian arena are still poorly understood. Based on the latest archaeological discoveries in China, this article focuses on the participation of four regions of ancient China: the Ejin River Transfer Zone (ERTZ); the western Hexi corridor; central Inner Mongolia; and the middle Yellow River valley. The article analyzed all significant innovations, materials, and technologies transmitted via the Eurasian network and adopted in ancient China, with an emphasis on metallurgy and the variations in the mechanism of its adoption across different societies during the Bronze Age.

Zhang, Quan**[117]** *Investigating the Diet and Health of Neolithic Boar in Central Turkey: A Pilot Study from Boncuklu Höyük*

Boncuklu Höyük (the ninth millennium to the eighth millennium cal. BC) is an Early Neolithic settlement found in the Konya Plain, Central Anatolia. At this site, wild boar (*Sus scrofa*) is the most common species found in the mammal remains. This pilot study tries to explore the relationship between Boncuklu boar and the community that inhabited this area. Samples of archaeological boar's teeth from Boncuklu Höyük are analyzed using three methods: 1) dental morphometrics, 2) dental microwear analysis, and 3) Linear Enamel Hypoplasia, of which dental microwear analysis is the focus in this initial study. These methods allow insights into the diet and health condition of Boncuklu boar. As omnivores, boar have potential to compete with humans for food. Especially, the initial cultivation of crops in Boncuklu probably aggravated this competitive relationship. It is likely that intensive boar hunting aimed to control their population, while no evidence shows they were closely managed by humans. The study of Boncuklu boar potentially reveals the subsistence strategy of the Boncuklu community and the early pig domestication in Central Anatolia.

Zhang, Xu (Institute of Archaeology, Chinese Academy of Social Sciences), Yajun Zhang (Institute of Archaeology, Chinese Academy of Social Sciences) and Tao Tong (Institute of Archaeology, Chinese Academy of Social Sciences)**[115]** *Preliminary Analysis on the Health Status of Human Skeletal Remains from Ali Region of Tibet*

The Tibet Autonomous Region is located on the Tibetan Plateau, which is one of the most active areas in the development and interaction of ancient cultures. Human remains from Gur-gyam cemetery (1800±BP) in Gar County (often known as "Ali"), Ngari Prefecture of the western Tibet Autonomous Region of China is a group of inhabitants during the Xiang Xiong Kingdom period. It lies in front of a modern Bon monastery of Gur-gyam, which affirmed the capital of the ancient Xiang Xiong Kingdom based on both local Bon adherents' oral tradition as well as archaeological evidence, which have significant academic value for studying the archaeological culture before imperial Tibet. This study investigates the health condition of ancient humans from Gur-gyam cemetery by studying dental disease. The results show that meat was the main part of their food supply, while there was still a number of carbohydrates in their diet; and the results indicate that the agricultural, which the ancient population from Ali area had, probably arrived at the mutual level. It not only provides an evidence of the human health status in the Xiang Xiong Kingdom, but also helps greatly to establish a new understanding of health conditions of ancient residents in this region.

Zhang, Zhe**[116]** *Mass Procurement and Feasting at Houtaomuga site, Northeast of China*

Houtaomuga is a late Neolithic site located in the northeast of China. A special feature G2 has produced a large sample of aurochs (*Bos primigenius*) skeletal remains. Examination of the assemblage in G2, including bone quantity, surface modification and mortality profile suggests a site of mass aurochs procurement that took place during late summer to fall. Feasting is suggested to be a likely reason that could lead to this mass deposition.

Zhang, Zhouyu and Jianli Chen**[58]** *How the Han Empire Managed the Large-Scale Iron Production: A Study Report of Iron Smelting Sites in Shandong Province and Henan Province*

This paper is mainly about a study report of several iron smelting sites in Shandong and Henan province. By analyzing archaeometallurgical remains from large-scale iron production sites, this presentation tries to clarify issues under-addressed in previous excavation reports and shed new light on the iron technology, production organization, and the management of Iron Offices of the Han Empire that led to the developmental peak of iron industry in Chinese history.

Zhao, Chao**[33]** *The Emergence of Blade Industry in Late Upper Paleolithic Central Plain of China*

The lithic remains of blade manufacturing have been found in the Central China Plain dating to roughly 25 ka BP. Based on chaîne opératoire analysis of lithic assemblages from Dongshi and Xishi sites, the blade industry in this region shared many features in common with typical blade industries of Western Eurasia. Such discovery challenges the presumption that the hinterland of East Asia lacked the development of blade industrialization during the Paleolithic age. The emergence of blade crafting reflects a great change in technical tradition in North China and begs the question of whether this change was caused by cultural transmission from the north and west or whether it was stimulated by a shift in local adaptive strategy. By comparing the lithic assemblages in larger temporal and spatial frames, as well as by exploring the technical organization of blade manufacturing in the Central China Plain, it is argued that the emergence of the typical blade industry in this region was influenced more by cultural transmissions from the Eurasian Steppe. Additionally, environment changes of the Central China Plain at 25 ka BP created a positive condition for the local people to accept this new technology and reform it in later periods.

Zhao, Xin (Institute of Archaeology, Chinese Academy of Social Sciences, Beijing, China)**[116]** *Ancient DNA Studies of Domesticated Cattle in Northern China*

This study aims to use ancient DNA techniques to characterize the genetic features of ancient domesticated cattle in order to trace the origin and spread of cattle in ancient China from eight Late Neolithic and Bronze Age sites in Northern China. DNA was successfully extracted from ancient cattle bone or tooth samples in dedicated ancient DNA labs following vigorous protocols for contamination controls. This study was focused on amplifying mitochondrial D-loop using standard PCR techniques. Among the obtained mtDNA sequences, several haplogroups could be identified including haplogroup C, which belongs to *Bos primigenius*. Our analysis indicated that there were different ways cattle might have been brought into China. In addition, this study also demonstrated the unique contribution that ancient DNA analysis can make, when combined with archaeological contexts, to our understanding of the origin and history of domesticated animals and to the reconstruction of human-animal interactions in the past.

[116] *Chair***Zhao, Yichao (Shandong Institute of Cultural Relics and Archaeology)****[213]** *Use-Wear Analysis on Cooking Vessels of the Longshan Culture: Case Studies on the Tonglin Site*

Some preliminary research on ceramic vessels of the Longshan culture had indicated li vessels as the most important type of cooking vessels. Vessel's categories might not exclusively indicate a vessel type. As was observed for the Tonglin site, an important site of Longshan culture at Linzi, li, guan, and pen vessels are the most abundant categories type. However, li vessels of Tonglin site have small rim diameter sizes on average, and it is necessary to collaborate use-wear analysis for defining li, guan, and pen vessel type. It is confined to the double handled guan and the three-legged pen with use-wear marks, which indicate possible specifically used for cooking practices. Moreover, use-wear analysis performed on ceramic vessels shows that the main difference between li, guan, and pen vessels was a mix of dry or wet cooking modes.

Zhao, Yongsheng (Shandong University), Wen Zeng (Shandong University) and Shangwu Jiang (Shandong University)**[115]** *A Study of Kneeling Facet Observed on Bronze Age Human Skeletons Excavated in North China*

The kneeling facet is formed on the metatarsal heads because of perpetual kneeling over a long period of time. It was observed in several sites in China. We analyzed the metatarsus of individuals of the Bronze Age from four sites in Shandong Province, China: 1) Daxinzhuang, 2) Liujiazhuang, 3) Chengziya, and 4) Houzhangda. We found that the kneeling facet is ubiquitous in Bronze Age individuals. No significant difference of the frequency is observed either between the sexes or among the owner of different levels of tombs; and the kneeling facet is more obvious within advancement of aging.

Zheng, Emily [29] see Meyer, Dominique

Zhong, Hua [279] see Ma, Mitchell

Zhonghua, Xin**[333]** *The Stone-Construction Tombs of Xiaguanzi in Maoxian County, and the Question of Cultural Contact throughout Western China*

Xiaguanzi site in Maoxian County, located at the junction of the upper reaches of Min and Fu Rivers, is an important node on the channels of culture transmission between North and South China. From 2014 to 2015, Neolithic remains and stone-constructed tombs were excavated. The Neolithic remains include pottery, stone and bone artifacts, leather objects, animal bones, plant seeds, house remains, tombs, and ash pits. Although there no painted pottery occurred at Xiaguanzi, the pottery found here is very similar to Neolithic finds from the upper reaches of the Min River. This is the first time that stone-constructed graves have been found in the upper reaches of the Min River. These stone-constructed graves are larger in size than the typical local stone-cist graves, and they are furthermore influenced by the Han culture. Based on stratigraphic evidence and the object types found in the graves, they can be dated between the early Western and the late Eastern Han, making them much later than previous finds in the region. The discoveries from Xiaguanzi are therefore very important for establishing the local chronology and developmental sequence of stone tombs in the Min River Valley and surrounding areas.

Zhou, Bright (Stanford University Archaeology Center)**[92]** *Bioarchaeological Assemblages at Çatalhöyük: A Relational Examination of Porotic Hyperostosis and Cribra Orbitalia Etiologies and Transmissions*

Porotic hyperostosis, manifested as pittings on the outer table of the cranial vault, and cribra orbitalia, the analogous porosities that form on orbital roofs, are two commonly observed pathologies used extensively by bioarchaeologists to understand past health and nutritional conditions. Yet the etiologies of porotic hyperostosis and cribra orbitalia are largely varied and not well understood, with proposed explanations ranging from diet and nutrition to chronic and infectious diseases. This paper exists to: 1) create a novel theoretical framework to holistically examine porotic hyperostosis and cribra orbitalia etiologies, and 2) apply the theoretical model to bioarchaeological data gathered from Çatalhöyük, Turkey in order to arrive at an extended evolutionary understanding of disease transmission. I draw upon relational theories to reconsider etiologies not as distinct prongs, but as an integrated assemblage of the body, pathology, and environment. Furthermore, I show how a fuller incorporation of social and cultural behaviors into the porotic hyperostosis and cribra orbitalia etiological models helps explain the static rates of the lesions over time, despite increasing population growth. I conclude by articulating the need for archaeologists to incorporate the wide range of factors influencing inheritance so that more comprehensive models for disease ecology can be constructed.

[348] *Discussant***Zhou, Yawei (History College, Zhengzhou University, Zhengzhou, China), Qipeng Yan (Shaanxi Normal University) and Wanfa Gu (Zhengzhou institute of cultural relics)****[115]** *Health and Stress of Neolithic Yangshao Culture Skeletal Population from Wanggou Site, Zhengzhou*

The Wanggou site, located in the Lower Yellow River valley, is a large Yangshao culture cemetery, dating to 7000–5000 BP. Two hundred and eleven skeletons were examined for variations from normal morphology, including nonmetric traits, to characterized pathology of the Neolithic Age residents of Central China. This paper examined skeletal evidence of bone disease, trauma and musculo-skeletal stress markers (MSM) of ancient residents. A prevalence of spina bifida, spondylolysis, lumbarization, sacralization and septal aperture have significant gender differences. The prevalence of cribra orbitalia and porotic hyperostosis are high in infants (20%) and children (66.67%), and relatively low in adults (0.6%). The high frequency of lumbar joint disease (29.31%) may be related to long-term engagement in agricultural activities such as planting. The rate of overall skeletal trauma is 9.05%; and skull trauma is 14.29%. Females (38.55%) have higher MSM of the humerus than males (26.44%) for minimal changes, but in the higher levels of severity males have higher prevalence. Taken together these results allow us to begin to reconstruct Neolithic behavior, adaptation and lifeways in the Lower Yellow River valley during the Yangshao culture.

Zhou, Yudian [78] see Li, Yinghua

Zhu, Hong [115] see Eng, Jacqueline

Zhu, Sihong

[33] *Interpretation of "Figure with Green Facial Expression" Unearthed in Pit No.2 in Emperor Qinshihuang's Mausoleum Site Museum*

There are various opinions about this kneeling archer which was unearthed in Pit No.2 at Emperor Qinshihuang's Mausoleum Site Museum known as the "Figure with Green Facial Expression." This paper holds a view that it should be called the "Figure with Cyan Facial Expression"; and combined with the ideological and cultural backgrounds and perception of colors, so to express the humanity and politics of Chinese color theory under the influence of Yin-Yang and Five-element thoughts. Seen from the original meaning of "cyan," it gives warriors a sense of youthful vigor. Analyzed from the point of color psychology, "cyan" means humanistic property which shows the inner personality of warriors, such as loyalty, education and cautiousness. In addition, the "figure with cyan facial expression" is a reflection of color diversity used in the art fabrication of terracotta warriors.

Zhu, Xiaoting (Nanjing Museum, Nanjing, Jiangsu, China), Hong Zhu (Research Centre for Chinese Frontier Archaeology), Hua Zhang (Department of Archaeology, Simon Fraser University), Dongya Yang (Department of Archaeology, Simon Fraser University) and Minghui Wang (IA CASS)

[115] *Preliminary Investigation of Health and Stress in a Human Skeletal Population of Liangzhu Culture from Jiangzhuang Site, Xinghua, Jiangsu*

This present study investigates human skeletal remains (N = 108) of Jiangzhuang site from Xinghua, Jiangsu, China. Jiangzhuang, dated to the Liangzhu Culture (ca. 3400–2250 BC), provides a unique opportunity to explore the stress and lifeways of ancient people from the Neolithic rice agricultural community in East China, since the preservation of human remains is very rare due to the acidic soils of the region. Multiple skeletal indicators of stress were examined including oral pathologies, nonspecific indicators of nutritional and physiological disturbance (cribra orbitalia, linear enamel hypoplasia, osteoperiostitis, and activity-related osseous manifestations (osteoarthritis and enthesal changes). In conjunction with other lines of bioarchaeological evidence (stable isotopic and a DNA analyses), our results suggest that health was adversely affected in several ways, particularly considering the robust enthesal markers indicating a heavy workload. However, dental health was relatively good overall testifying the low-starch rice agriculture. This study adds to our growing understanding of the ways in which the transition to a rice agriculture changed stress exposure and lifeways of the people of Jiangzhuang in Neolithic East China.

Zhuang, Yijie [78] see Lian, Huiru

Zhuravlev, Denis [221] see Schlotzhauer, Udo

Ziegler, Michael [87] see Warren, Shannon

Ziegler, Michael (George Washington University), Shannon Warren (Colorado State University), Ssebuyungu Christopher (Makerere University), Silindokuhle Mavuso (University of the Witwatersrand) and Kathryn L. Ranhorn (George Washington University)

[153] *Site Formation Analysis of Middle Stone Age Locality GaJ17 in the Koobi Fora Formation, Northern Kenya*

The Koobi Fora Formation (KF Fm.) of the Turkana Basin in Kenya is comprised of a Plio-Pleistocene sedimentary sequence that has produced unprecedented paleoanthropological discoveries. Previous work in the KF Fm. reported an archaeological locality, GaJ17, exhibiting in situ Middle Stone Age (MSA) material eroding from an indurated sandstone. Understanding the depositional context of this locality required further geologic study as few MSA localities are represented in the KF Fm. This is due to the extensive unconformity between the youngest Mbr. of the KF Fm., (Chari Mbr. <1.39 Ma) and the overlying Galana Boi Fm. (<10 ka). Renewed excavations at GaJ17 allowed for sedimentary facies analyses, revealing associated aeolian and fluvial lithofacies. We further evaluate the depositional history of the archaeological horizon using standard fabric analysis of archaeological materials. Geochronological studies were also conducted (e.g., optically stimulated luminescence (OSL) and radiocarbon). Performing the geochemical (XRF) identification of a tuff that underlies the archaeological horizon provides further geochronological control. Mineralogical and petrographic studies of the surrounding sediments provide an understanding of the depositional context and sediment provenance. This research was supported by the NSF International Research Experience for Students (OISE 1358178 and 1358200).

Ziesemer, Kirsten (Leiden University), Allison E. Mann (Max Planck Institute for the Science of Human Hist), Bernd W. Brandt (Academic Centre for Dentistry Amsterdam, Amsterdam), Corinne L. Hofman (Leiden University) and Christina Warinner (Max Planck Institute for the Science of Human Hist)

[69] *New Approaches to Study Health and Disease in the Precolonial Circum-Caribbean*

The most frequent pathologies found throughout the circum-Caribbean before arrival of the Europeans are dental and periodontal diseases. To date, ancient oral health has been studied using a variety of techniques, and recently ancient DNA (aDNA) analysis of dental calculus (calcified plaque) has shown great promise in revealing not only (oral) health and disease, but also diet and the composition of the oral microbiome over archaeological timescales. In this paper, we present ancient metagenomic data generated from human dental calculus from multiple archaeological sites in the circum-Caribbean. We compare the phylogenetic and taxonomic composition of precolonial oral microbiomes to modern dental calculus samples and find that the microbial composition of the precolonial Caribbean oral microbiome is similar to that of present-day populations. Our findings also shed light on the oral health and disease of indigenous communities before European contact.

Ziesemer, Kirsten [86] see Mann, Allison E.

Zilhão, João [169] see Real Margalef, Cristina

Zimmerman, Andrew [229] see Eusebio, Michelle

Zimmerman, Larry (IUPUI/Eiteljorg Museum)**[318]** *Discussant***Zimmermann, Mario (Washington State University)****[177]** *Maya Peasantry: Crop Diversity Past and Present*

For several years, peasant communities on the Yucatán Peninsula, Mexico, have not produced high enough maize-yields to sustain populations in the area. This is despite the fact that modern-day demographics are considerably lower than population estimates for the heights of Maya cultural development during the precolumbian era. Some scholars have argued that maize was not the sole staple for the ancient Maya. Root and tree crops are among the candidates for alternative staples given their productive potential and adaptation to the tropical conditions of the Yucatán Peninsula. A review of ethnographic as well as archaeological and ethnohistoric sources regarding Maya dietary patterns provides a picture of inconsistencies and temporal dissociations. On the other hand, recent advances in paleoethnobotany promise to provide more direct clues on alternative crops that had been successfully cultivated in the past. A better understanding of the role of maize within ancient Maya diet would allow us inform present day policies and decision-making processes. I argue that the archaeological record can contribute to the knowledge upon which a dialogue between scholars, politicians, and Maya farmers will be found to improve the living-conditions of the latter and increase the level of dietary auto-sufficiency in the area.

[349] *Discussant***[349]** *Chair*

Zimmermann, Mario [5] see Fernandez Souza, Lilia

Zinsious, Brandon (University of Louisville) and Jonathan Haws (University of Louisville)**[165]** *Lapa do Picareiro and the Gravettian-Solutrean Transition: Refining the Chronology of the Solutrean Techno-Complex in Western Iberia*

The Solutrean techno-complex, traditionally divided into three broad temporal phases, has been an area of great interest for those studying human adaptations during the Upper Paleolithic, specifically the Last Glacial Maximum. Distinguishing more discrete phases of the Solutrean period is hampered by the lack of adequate radiocarbon dates from secured contexts. Currently, Solutrean stratigraphic information relies mostly on older excavations that produced lower resolution data. This paper presents new radiocarbon dates associated with Terminal Gravettian and Lower Solutrean archaeological contexts at the site of Lapa do Picareiro, in central Portugal. Using fine spatial recording methods and a complete series of carbon dates for lithic-bearing stratigraphy spanning the entire Solutrean sequence, new information is presented for the discussion on phases outside of the three-part chronology currently used to divided the Solutrean techno-complex. This Gravettian-Solutrean transitional phase, or what may be referred to as the Proto-Solutrean, is a main focus of this ongoing project. This paper will consider the broader implications of these new datasets on improving our understanding of Human adaption during the LGM and long distance contact between Iberian populations, helping archaeologists to better define the Solutrean in terms of its temporal and archaeological contexts.

Zipkin, Andrew [146] see Thompson, Jessica

Zori, Colleen**[323]** *Multi-Scalar Analysis of Copper and Silver Production under the Inka: A Case Study from Northern Chile*

Andean prehistory witnessed the development of numerous regional metallurgical traditions that were harnessed and significantly restructured as the Inka empire (AD 1400–1532) expanded along western South America. Taking the Tarapacá Valley of northern Chile as a case study, I analyze how imperial incorporation altered the production of copper and silver across multiple spatial scales. I begin at the regional level, analyzing how the procurement and transport particularly of silver-bearing ores was undertaken by the empire. Specifically, the technical and logistical difficulties presented by local silver mines demanded a degree of coordination virtually impossible without the organizational capabilities of the Inka state. I then present data related to valley-level changes, focusing on how Inka incorporation altered the spatial distribution of smelting sites in the Tarapacá Valley. These data indicate that metallurgical activities became increasingly concentrated at Tarapacá Viejo, the imperial administrative center. Finally, I take a site-level approach to the organization of copper and silver refining, documenting the physical and social segmentation of the production process. This study provides important insights into the impacts of imperial incorporation on metal production, focusing on how interconnected changes occurred at scales from the regional to across a single site.

Zori, Colleen [164] see Schultze, Carol

Zubrow, Ezra B.W. [90] see Ruhl, Erika

Zúñiga Arellano, Belem (Proyecto Templo Mayor) and Adrian Velazquez-Castro (Museo del Templo Mayor-INAH)**[225]** *The Anahuatl Pectorals from the Offerings of the Great Temple of Tenochtitlan*

The anahuatl pectoral is one of the shell ornaments that have been found in the offerings of the great temple of Tenochtitlan. In paintings and sculptures, it is worn by Tezcatlipoca and deities that are stars and warriors, as Tlahuizcalpantecuhtli and Mixcoatl. Inside the offerings, the anahuatl are associated to items related to the underworld, sacrifice and war. This has led to propose that these pectorals represented the stars, which were the warriors during the night. The presence of the anahuatl pectorals in the tenochca offerings dates back to constructive stage IVb (AD 1469–1489), when a tenochca style of manufacturing shell objects is created. By this time, these pieces were always made of Pinctada mazatlanica shells, which were abraded with basalt stone and cut and decorated with obsidian tools. Nevertheless, in offerings excavated recently that correspond to constructive stage VI (AD 1489–1502), anahuatl pectorals have been found made with different tools and even of fresh water mussels. In this paper some possible explanations to these changes are presented.

Zúñiga Arellano, Belem [225] see Gaytán-Caballero, Adriana

Zúñiga Arellano, Belem [225] see López Luján, Leonardo

Zurro, Debora (CaSEs. Department Archaeology & Anthropology. IMF-CSIC)
[274] *Chair*

Zutter, Cynthia (MacEwan University)
[291] *Discussant*

Zwyns, Nicolas (University of California-Davis), Damien Flas (TRACES-UMR 5608, Université de Toulouse), Aurora Allshouse (University of California-Davis), Johua Noyer (University of California-Davis) and Kevin Smith (University of California-Davis)

[389] *The Initial Upper Paleolithic of Northern Mongolia: Site Function, Mobility, and Assemblage Plasticity*

In the broadest sense, the term Initial Upper Paleolithic refers to archaeological assemblages that, without being necessarily 'transitional,' combine retained Middle Paleolithic and derived Upper Paleolithic features. Here, we present an assemblage that documents such a phenomenon at the site of Tolbor 16, northern Mongolia. Although we suggest that the layer 7b can be assigned to the northeast Asian variant of the IUP, a detailed analysis and the use of a narrow definition highlights some aspects of the technical systems as being subject to functional plasticity. For example, measured frequencies of MP tool types and blade blanks may not exclusively represent an evolutionary stage, but also reflect patterns of recycling and export. With a lack of well-preserved fauna, the lithic assemblage could then be used as a proxy to address issues of preservation bias, spatial distribution and site function. By comparing our results with other examples from the Tolbor Valley and from Siberia, we discuss how settlement patterns influence our understanding of the IUP phenomenon and its evolution. Our observations suggest that, while plasticity may affect our ability to recognize IUP, the technological structure of lithic assemblages remains surprisingly consistent.

Zwyns, Nicolas [113] see Peng, Fei

Zych, Thomas (University of Toledo) and Brian Nicholss (University of Wisconsin-Milwaukee)
[341] *Sculpting a Mississippian Aztalan: A Landscape Perspective*

The culmination of over a century of research at the Aztalan site in south-central Wisconsin has highlighted the drastic extent of landscape modification by the site's inhabitants. Notably, with the arrival of Middle Mississippians by the end of the eleventh century AD these modifications included construction of earthen platform mounds, formal plazas, and landscape reclamation. Utilizing publicly available lidar derived surface data for Jefferson County, Wisconsin, this poster presents a summary of the terrain and morphometric analyses of the site and its surrounding environs. The analysis of the landscape along the Crawfish River Valley adjacent to the site aims to further underscore the scale of landscape modifications associated with the socioreligious practices of Middle Mississippian populations in the Eastern Woodlands.