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# Program and Abstracts

SOCIETY FOR  
AMERICAN ARCHAEOLOGY

FORTY-FOURTH ANNUAL MEETING

Vancouver, British Columbia

April 23-25, 1979

Forty-Fourth Annual Meeting

## SOCIETY FOR AMERICAN ARCHAEOLOGY

<i>Program Chair:</i>	Anta Montet-White
<i>Program Committee:</i>	Kenneth Reid, Theresa Stanley, Jason Ota, Mary Jones
<i>Review Committee:</i>	Leslie Freeman, Albert C. Spaulding, John Speth, Robert J. Squier, Raymond W. Wood

Joint sessions with the Canadian Archaeological Association will be held on Wednesday, April 25, 1979; they are identified in the program as SAA/CAA joint symposia.

## OFFICERS OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY

<i>President:</i>	Cynthia Irwin-Williams
<i>President-elect:</i>	Fred Wendorf
<i>Secretary:</i>	Alfred E. Johnson
<i>Treasurer:</i>	Jeffrey S. Dean
<i>Editor:</i>	Jeremy Sabloff
<i>Executive Committee Members:</i>	George F. MacDonald and William D. Lipe (to 1979) David A. Breternitz and Ernestene L. Green (to 1980)

## GENERAL INFORMATION

Abstracts of papers presented at this meeting are included in the Program. Additional copies are available for \$2.00 per copy at the membership services desk or may be ordered prepaid from the Society, 1703 New Hampshire Avenue, NW, Washington, DC 20009.

**Business Meeting** The Society's annual business meeting will begin at 5:30 pm on Tuesday in the Pacific Ballroom.

**Convention Office** Any problems or special requests during the meeting should be reported to the Lions Room.

**Exhibits** Publishers' book exhibits will be displayed in the Alouette Room from 5 pm to 8 pm on Sunday, 9 am to 6 pm on Monday and Tuesday, and 9 am to 4 pm on Wednesday.

**Membership Services and Publications** A desk will be maintained in the British Columbia Foyer during the registration hours for those who wish to purchase publications or enroll in the Society.

**New Member Reception** Officers of the Society will host a reception for new members and for those attending their first meeting on Tuesday at 8 pm in the Tweedsmuir Room.

**Open House** Everyone is invited to an open reception (cashiered bar) on Monday at 5 pm in the British Columbia Foyer.

**Placement Service** A placement service will be conducted in Rooms 209 and 211 from 9 am to 5 pm Monday through Wednesday. Positions open or wanted may be listed with the service throughout the meeting. Message forms will be provided, and box numbers will be assigned for use in the placement service message center.

**Registration** Registration, which includes a copy of the *Program and Abstracts*, is required for attendance at all sessions. Registration desks will be open in the British Columbia Foyer from 4 pm to 8 pm on Sunday, 8 am to 4 pm on Monday and Tuesday, and 8 am to noon on Wednesday. Members who preregistered by April 6 should claim their badges and programs at the *advance registration desk*.

**Symposia and Session Chairs** Please maintain the established schedule scrupulously in fairness to persons planning to attend sessions at specific times to hear particular speakers; please pause for the period allotted in the program if a scheduled speaker fails to appear.

**Meeting Room Directory** Hotel Vancouver Convention Floor: Alouette, Board, British Columbia Foyer, British, Columbia, Garibaldi, Lions, Pacific, Tweedsmuir, Vancouver Island, Waddington; First Floor: Chart, Social Suite East, Social Suite West; Second Floor: 200, 201, 209, 211.

PROGRAM

MONDAY MORNING, APRIL 23

- 9.00 SOCIETY FOR AMERICAN ARCHAEOLOGY  
Garibaldi  
Meeting of the Executive Committee
- (1) Symposium: PRELIMINARY RESULTS OF THE INTERDISCIPLINARY INVESTIGATIONS IN THE AYACUCHO VALLEY OF HIGHLAND PERU  
Columbia Room  
Organizer and Chairperson: R. K. Vierra  
Participants:
- 9.00 Nathaniel W. Rutter, Late Quaternary Climatic Reconstruction of the Ayacucho Basin Area of the Central Peruvian Andes  
9.20 Carl Phagan, Variability in Jaywa Phase Lithics  
9.40 Rochelle Goodsitt and R. Knudson, Functional Analysis of Chipped Stone Tools from the Ayacucho Valley  
10:00 Michael Deniro and S. Epstein, Analysis of the Use of Maize as a Dietary Constituent from the  $^{13}\text{C}/^{12}\text{C}$  Ratios of Collagen in Fossil Human Bone: Tehuacan Valley, Mexico and Viru Valley, Peru  
10:30 Vaughn Bryant and G. Weir, Prehistoric Diets in the Ayacucho Region of Peru: The Coprolite Evidence  
10:50 Elizabeth Wing, Prehistoric Use of the Andean Regional Fauna  
11:10 Robert K. Vierra, Differences in Resource Selection Strategies and the Use of Rock Shelters in the Ayacucho Valley, Peru  
11:30 Richard S. MacNeish, Summary of Ayacucho Interdisciplinary Studies
- (2) Symposium: EXPERIMENTAL DATA SETS AND HUMAN BEHAVIOR: PREDICTIVE AND ANALYTICAL MODELS  
British Room  
Organizers and Chairpersons: S. M. Perlman and S. W. Green  
Participants:
- 9:00 Martin Wobst, Square Answers from Miscellaneous Holes: Experiments in Subsurface Sampling  
9.20 John Speth, The Role of Platform Angle and Core Size in Hard-Hammer Percussion Flaking  
9:40 Stephen Perlman, Optimum Foraging Behaviors and Nut Return Rates  
10:00 James Moore, Terminal Archaeology: The Use of Computer Simulation in Theory Building  
10:40 Robert Paynter, From Settlement Systems to Settlement Patterns: A Study in Non-Experimental Control  
11:00 Stanton Green and Stephen Perlman, Understanding Archaeological Site Formation: A Simulation Approach  
11:20 Gerald J. Kukan, Progress and Variability in Tool Design during the Old World Paleolithic
- (3) Symposium: THE ARCHAEOLOGY OF THE LOWER COLUMBIA RIVER REGION  
Social Suite East  
Organizer and Chairperson: Robert W. Keeler  
Participants:
- 8:30 Richard Pettigrew, Problems in the Future of Lower Columbia Research  
8:50 Richard Yerkes, Chinook Houses and Houselife: Semi-Subterranean Plank Houses at (45-SA-11) Clah-clah Site, North Bonneville, Washington  
9:10 Mark C. Chavez and Leonard T. Laverdera, Analysis of a Riverbank Activity Area from 45-SA-11  
9:30 Sarah Campbell, Late Prehistoric Sturgeon Procurement on the Lower Columbia River: The Evidence from Hamilton Island, Skamania County, Washington  
9:50 Richard Yerkes and Jennifer Fox, The Large Mammal Remains from 45-SA-11  
10:30 Kevin Harris, The Social and Economic Functions of Chinook Trade  
10:50 Bart Wilson, Excavation of a Historic Structure at 45-SA-11  
11:10 Rick Minor, Site Destruction or Survival: Limiting Factors in Interpreting Lower Columbia Prehistory  
Discussants: John Fagan, Don Dragoo, Robert Dunnell

- (4) Symposium: RESEARCH DESIGN IN CULTURAL RESOURCE MANAGEMENT  
 Social Suite West  
 Organizer and Chairperson: Craig B. Harmon  
 Participants:  
 10:00 F. R. Hauck, Essentials and Potential of the Research-Oriented Archaeological Firm  
 10:20 James L. Dykman, Utilization of National Register Criteria and Status in Research Designs for Cultural Resource Projects  
 10:40 Steven R. James, Seismic Line Surveys: A Potential for Research  
 11:00 Paul Nickens, Regional Research Design Development in Cultural Resource Management: Problems and Prospects  
 11:20 Elizabeth Budy and Lonnie Pippin, Research and Design in Contract Archaeology: An Examination of Two Sampling Designs

- (5) Symposium: PREHISTORIC CRAFT PRODUCTION I  
 Vancouver Room  
 Organizers and Chairpersons: Barbara L. Stark and Gary Feinman  
 Participants:  
 8:30 Paula Krotser, Production and Distribution of San Martin Orange: An Example of Prehistoric Specialization and Distribution at Teotihuacan, Mexico  
 8:50 Evelyn Rattray, Ceramic Production and Social Organization at Teotihuacan, Mexico  
 9:10 Michael Spence and Jerome Kimberlin, Obsidian Procurement Systems of Teotihuacan, Mexico  
 9:30 Jill Appel, Lithic Production in the Valley of Oaxaca, Mexico  
 9:50 Gary Feinman, Changes in the Organization of Ceramic Production in Prehistoric Oaxaca, Mexico  
 10:20 Judith A. Nowack, Ceramic Production in Early Classic Tehuacan  
 10:40 Rafael Abascal Macias, Prehistoric Pottery Villages  
 11:00 Barbara Stark, Analysis of Production in Ceramics: A Veracruz Example  
 Discussants: W. L. Rathje, Sander Van der Leeuw

- (6) Symposium: RADAR IN ARCHAEOLOGY  
 Waddington Room  
 Organizer and Chairperson: Peter P. Pratt  
 Participants:  
 8:00 Roger S. Vickers, The Use of Radar in Archaeology, The Technical Aspects  
 8:20 Marjorie K. Pratt and Peter P. Pratt, A Subsurface Radar and Resistivity Survey in an Urban Setting  
 8:40 Joel W. Grossman, The Ground Penetrating Radar Survey at Raritan Landing  
 9:00 Bruce Bevan, Archaeological Uses of Ground-Penetrating Radar  
 9:20 Michael E. Roberts, Subsurface Radar and Prehistoric Sites

- (7) General Session: DATING TECHNIQUES  
 Waddington Room  
 Chairperson: Jonathan E. Ericson  
 Participants:  
 10:30 Jonathan E. Ericson, California Obsidian Hydration Rates  
 10:50 Stephen W. Robinson, Radiocarbon Corrections for Marine Shell Dates with Application to Prehistory of the Southern Northwest Coast  
 11:10 Daniel Wolfman, Recent Advances and Results in Alpha Track Dating  
 11:30 Michael W. Graves, Estimating Tree Ring Cutting Dates on Specimens Lacking Outer Rings  
 11:50 Henry P. Schwarcz and André Debenath, Uranium-Series Dating of Neanderthal Remains from the Cave of La Chaise de Vouthon, Charente, France

- (8) General Session: CURRENT RESEARCH IN THE SOUTHWEST UNITED STATES  
 Tweedsmuir Room  
 Chairperson: Alan D. Reed  
 Participants:  
 8:00 Deborah Olszewski, Tools for Thought: Some Difficulties with the Analysis of Southwestern Lithic Assemblages  
 8:15 Alan D. Reed, An Analysis of Ecological Variability and Site Location in Southwestern Colorado  
 8:30 Robert C. Euler, Havasupai-Cohonina Relationships in Grand Canyon

- 8:45 David A. Breternitz and Allen E. Kane, The Dolores Archaeological Project, Southwestern Colorado  
 9:00 T. J. Ferguson, Application of New Mexico State Dead Body and Indigent Burial Statutes to a Prehistoric Mummified Body  
 9:15 Judy L. Brunson, Corrugated Ceramics as Indicators of Interaction Spheres  
 9:30 T. Kathleen Henderson, Site Aggregation and Settlement System at Chavez Pass, Arizona  
 9:45 Jeanine M. Borger, Lithic Evidence for a Prehistoric Trade Route through Black Mesa, Arizona  
 10:15 Susan E. Bearden, Functional and Spatial Variation in Basketmaker II Sites on Black Mesa  
 10:30 Mary Lou Fricke, A Re-Investigation and Re-Evaluation of the Burial Rooms and Room 28 at Pueblo Bonito  
 10:45 Richard Ciolek-Torrello, Late Mogollon Settlement in Central Arizona  
 11:00 Norman M. Whalen, Archaeological Survey Between the Wilcox Playa and Dos Cabezas Mountains of Arizona  
 11:15 J. Simon Bruder, Prehistoric Settlement/Subsistence Strategies in the Uplands of Central Arizona  
 11:30 Thomas J. King, Jr., A Partial Archaeological Survey of Saguaro National Monument (East), Arizona

#### MONDAY AFTERNOON, APRIL 23

- 12:30- AMERICAN SOCIETY FOR CONSERVATION ARCHAEOLOGY  
 1:30 Tweedsmuir  
 Annual Meeting

- (9) Symposium: ECOLOGICAL AND EVOLUTIONARY IMPLICATIONS OF SETTLEMENT SYSTEMS IN PREHISPANIC MESOAMERICA  
 Columbia Room  
 Organizers: Susan T. Evans and David L. Webster  
 Chairperson and Discussant: William T. Sanders  
 Participants:  
 1:30 Robert Santley, Pricing Policies and the Decline of Teotihuacan Civilization  
 1:50 Richard Diehl, Mexican Gulf Coast Settlement Pattern: Problems and Solutions  
 2:10 Don S. Rice and Prudence Rice, Settlement Studies in the Central Peten Savannas  
 2:30 Ken Brown, Ecology and Settlement Systems in the Guatemalan Highlands  
 2:50 Deborah Nichols, Prehispanic Irrigation Agriculture and Settlement Patterns in the Basin of Mexico: A Test Case  
 3:30 Barbara Voorhies, Locational Analysis of Prehistoric Settlements in a Portion of the Coastal Humid Tropics in Chiapas, Mexico  
 3:50 Bruce Byland, A Locational Approach to Cultural Evolution in the Mixteca Alta Region of Oaxaca, Mexico  
 4:10 Susan T. Evans, Settlement and Land Use in the Late Horizon, the Teotihuacan Valley  
 4:30 David Webster, Three Walled Centers of the Northern Maya Lowlands

- (10) Symposium: ARCHAEOLOGY IN NORTHERN BELIZE: THE CUELLO PROJECT  
 Waddington Room  
 Organizer and Chairperson: Norman Hammond  
 Participants:  
 1:00 Norman Hammond and Sara Donaghey, Cuello: Excavations of 1978-1979  
 1:20 Duncan Pring and Joseph Ball, The Ceramic Sequence at Cuello  
 1:40 Laura Kosakowsky and Richard Wilke, Some New Methods for the Study of Maya Sites  
 2:10 Charles Miksicek, Lowland Maya Agriculture—The Archaeobotanical Evidence from Northern Belize

- (11) Symposium: RECOVERY FROM THE ILOPANGO VOLCANIC ERUPTION, EL SALVADOR  
 Waddington Room  
 Organizer and Chairperson: P. D. Sheets  
 Participants:  
 3:00 V. Steen-McIntyre and William J. Hart, Tierra Blanca Tephra: A 1700 Year Old Stratigraphic Marker Horizon for Mesoamerica

- 3:15 G. W. Olson, Effect of Volcanic Eruptions on Some Maya Soils in El Salvador
- 3:30 S. K. Short, Preliminary Pollen Study, Zapotitan Basin, El Salvador
- 3:45 K. Black, Settlement Patterns in the Zapotitan Valley, El Salvador
- 4:00 M. Matthews, The Ceren Survey and Test Excavations at C-2
- 4:15 S. Chandler, Excavations at the Cambio Site
- 4:30 C. Zier, Joya de Ceren: A Non-Elite Domestic Site in the Zapotitan Basin, El Salvador
- 4:45 J. Southward, A Classic Maya Farm Household and Polychrome Ceramics
- 5:00 M. Beaudry, Sherds Among the Ashes: The Ceramics of the Zapotitan Valley, El Salvador
- 5:15 A. Zier, The 1978 Protoclassic Project Ground Stone and Its Place in a Post-Eruptive Economy

(12) General Session: METHOD AND THEORY

Social Suite West

Chairperson: Jack D. Nance

Participants:

- 1:30 Susan M. Kus, Archaeology and Symbolic Production
- 1:50 Susan Dobyns, Identifying Ethnicity in the Archaeological Record
- 2:10 Julie E. Francis, The Use of Log-Linear Models as an Analytic Technique for Archaeological Data
- 2:50 Renata B. Wolyneć, A Feature Doesn't Have to do Anything—Feature Interpretations through the Application of Interpretive Models
- 3:30 Jack D. Nance, Models for the Meager: Small Sites Archaeology, Cultural Formation and Stochastic Process
- 3:50 Robert Layhe, Demographic and Settlement Change, Black Mesa, Northeastern Arizona: A Computer Simulation
- 4:10 Brian E. Spurling, Resource Inventory and Assessment in the Boreal Forest
- 4:30 Susan Kent, The Use and Refuse of Activity Areas: Spatial Patterning through Time and Space
- 4:50 Thomas H. Guderjan, Definition of Cultural Stratigraphy at Fort Polk Using Polythetic Classification Schemes

(13) Symposium: DEATH AND SOCIETY: MORTUARY SITE DATA AND SOCIAL ORGANIZATION

Tweedsmuir Room

Organizer and Chairperson: Nan A. Rothschild

Participants:

- 2:00 James Hatch, Status-Specific Nutritional Stress in a Mississippian Chiefdom
  - 2:20 Diana diZ. Rockman and Nan A. Rothschild, Variation in Adena Mortuary Sites
  - 3:00 Christopher Peebles, V. Steponaitis, M. Schoeninger, and M. Scarry, Temporal and Behavioral Dimensions of Ranking at Moundville
  - 3:20 Lynne Goldstein, One Dimensional Archaeology and Multi-Dimensional People: Spatial Organization and Mortuary Analysis
  - 4:00 Susan Shennan, The Role of Women in Early Bronze Age Slovakia
  - 4:20 Arthur A. Saxe, Nan Madol on Ponape, Eastern Caroline Islands, Micronesia
  - 4:40 N'omi Greber, Types of Social Information Derivable from Various Data Handling Techniques, with Application to Ohio Hopewell
  - 5:00 William L. Rathje, Dental Mutilation and the Classic Maya
- Discussants: Howard D. Winters, James A. Brown, Arthur A. Saxe

(14) Symposium: PREHISTORIC CRAFT PRODUCTION II

Vancouver Room

Organizers and Chairpersons: Barbara L. Stark and Gary Feinman

Participants:

- 1:30 Maurizio Tosi, The Marxian Concept of *Produktionskrafte* and the Archaeological Evidence for Craft Specialization in the Protohistoric Societies of Eastern Iran and the Indus Valley (ca. 3000-1800 B.C.)
- ~1:50 Craig Morris, Economic Growth and Political Strategies
- 2:10 James M. Vreeeland, Jr., Specialized and Non-Domestic Fabric Production in Highland Peru: A Prehispanic Continuity
- 2:30 Jane Stone, The Socio-Economic Implications of Lithic Evidence from Huari, Peru
- 2:50 Suzanne De Atley, Organizational Requirements for Specialized Ceramic Production in the Southwest, a Preliminary Review
- 3:30 Jeffrey L. Hantman, Kent G. Lightfoot, and Steadman Upham, The Implications of Changing Ceramic Production in the Prehistoric American Southwest

- 3:50 Phillip H. Shelley, Site Entry "Pose" and Its Implication for Craft Specialization: A Case Study from Salmon Ruin, San Juan County, New Mexico
  - 4:10 Prudence M. Rice, Some Considerations for the Study of Specialized Pottery Production
- Discussants: F. Plog, Sander Van der Leeuw

(15) Symposium: KOSTER: THE EARLY AND MIDDLE ARCHAIC HORIZONS

Social Suite East

Organizers and Chairpersons: David L. Carlson and R. K. Vierra

Participants:

- 1:00 Thomas G. Cook, Koster Site: Middle Archaic Curatorial Behavior
- 1:20 Michael D. Wiant, The Analysis of Archaeological Features
- 1:40 Sarah W. Neusius, Faunal Remains, Flotation, and Sampling at Koster: Methodological Implications
- 2:00 Nancy Asch and David Asch, Archaeobotany of the Koster Site: The Early and Middle Archaic Horizons
- 2:20 David L. Carlson, Mobility Strategies and Site Structure at Koster
- 2:40 James A. Brown and R. K. Vierra, Koster Site Research: An Overview

(16) Symposium: NATURAL AND CULTURAL PROCESSES IN THE FORMATION OF AN ARCHAIC SHELL MIDDEN ON THE GREEN RIVER, KENTUCKY

Social Suite East

Organizer and Chairperson: William H. Marquardt

Participants:

- 3:30 W. Marquardt and P. J. Watson, Shell Midden Formation and Deformation: A Case Study
- 3:50 J. Alan May, Shell Midden Formation Processes: Methodological Perspective
- 4:10 Gail E. Wagner, The Green River Archaic: A Botanical Reconstruction
- 4:30 Julie Stein, Geologic Analysis of the Green River Shell Middens
- 4:50 Linda A. Gorski, Microstratigraphy at the Carlston Annis Site
- 5:10 William H. Marquardt, Shell Midden Formation Processes: Implications for the Green River Archaic

(17) Symposium: THE ETHICS OF CONTRACTING

Sponsoring Organization: American Society for Conservation Archaeology

British Room

Organizer and Chairperson: C. R. Cummings

Participants:

- 1:30 George J. Gumerman, The Letter Versus the Spirit of the Law in Contract Archaeology
  - 1:50 James W. Judge, Minimum Impact Survey in a Management Context
  - 2:10 Hester Davis, The Problems and Ethics of Budget and Cost Accounting
  - 2:30 Leslie Wildesen, Getting Us All Together: Cultural Resources Contracting in the Pacific Northwest
  - 2:50 Fred Plog, Dealing with Sites: Preservation or Archaeo-poker
  - 3:30 Ward F. Weakly, Ethics and the Archaeological Contractor
  - 3:50 Predatory Archaeology: Territoriality and the Resource Base
  - 4:10 James Fitting, Archaeologists as Real Live People
- Discussants: Charles Cleland, Dena Dincauze, Douglas Scovill

(18) Symposium: OLD WORLD ARCHAEOLOGY FOR NEW WORLD ARCHAEOLOGISTS

Sponsoring Organization: Archaeological Institute of America

Pacific Ballroom

Organizer and Chairperson: Richard E. W. Adams

- 2:00- Participants: C. Young
  - 4:30 F. Frost
  - J. Dengate
- Discussant: Charles Di Peso

- 5:00 OPEN HOUSE
- British Columbia Foyer  
Cashiered Bar

MONDAY EVENING, APRIL 23

7:00- NATIONAL ASSOCIATION OF STATE ARCHAEOLOGISTS

9:00 Tweedsmuir  
Annual Business Meeting

7:00- BRIDGING THE GAP: GRADUATE SCHOOL TO PROFESSIONAL JOBS

11:00 Social Suite West

A Workshop sponsored by the Committee on the Status of Women in Archaeology. Organizer and Chair: E Suzanne Carter. Activities will involve collecting background information on the student participants for a long-range monitoring of their career patterns, and a training session.

- I Examination of the "success" role model for women
- II Projection of career line for each participant
- III Ordering priorities
- IV Adopting success-oriented behaviors and attitudes
- V Putting it to work
- VI Each One Teach One—Taking it home to other graduate students

TUESDAY MORNING, APRIL 24

(19) Symposium: HISTORY OF ARCHAEOLOGY

Waddington Room

Organizer and Chairperson: Alan McPherron

Participants:

- 8:30 Richard S. MacNeish, WPA Archaeology: The Greening of American Archaeology?
  - 8:50 Eugene Sterud, The Anatomy of Archaeological Innovation: Citation Analysis
  - 9:10 Bruce Trigger, Archaeology and the American Indian
  - 9:30 Alan McPherron, The Intellectual Milieu of the Development of Archaeology
  - 9:50 Lester Embree, The New Archaeology and the New Philosophy of Science
  - 10:10 George Knight, The Historiography of Anthropological Archaeology
- Discussant: James Fitting

(20) Symposium: SIMULATION IN ARCHAEOLOGY

Waddington Room

11:00 Note: The text of papers to be discussed in this session will be posted Monday afternoon in Room 200.

Organizers and Chairpersons: William D. Lipe and Steven Hackenberger

Participants:

Steven Hackenberger, Decision Criteria, Economic Standard of Living and Homeostatic Population Regulation

Bruce Dickson, Ancient Agriculture and Population at Tikal, Guatemala: An Application of Linear Programming to the Simulation of an Archaeological Problem

Alan N. Snavely and Cindy J. Parsons, Simulating Unobserved Parameters in Site Formation

Sarah Schlanger and William D. Lipe, Processes of Growth in Southwestern Pueblos

James Moore and Stanton Green, Evaluating Models of Agricultural Expansion

Linda S. Cordell, Deterministic vs. Stochastic Simulation of Anasazi Site Location and Land Use

(21) Symposium: ECOLOGICAL MODELS IN ECONOMIC PREHISTORY

Social Suite West

Organizer and Chairperson: Gordon Bronitsky

Participants:

- 8:30 Frederick Limp, Resources and Rationality: Ecological and Economic Analogues
- 8:50 Don Hardesty, Niche Theory and Patterns of Economic Diversity
- 9:10 Timothy Earle, The Centralized Economies of Stratified Societies
- 9:30 Judith Rasson, The Use of Climatic Data in Ecological Models
- 9:50 Gordon Bronitsky, Economic Change in the Rio Grande Valley
- 10:20 Kent Lightfoot, Multi-Site Communities in the Prehistoric Southwest, an Example from Pinedale, Arizona

- 10:40 Steadman Upham, Peripheral Markets in the 14th Century Plateau Southwest
  - 11:00 Robert Gasser, Mini-Maxing it in the American Southwest: A Case from the Anasazi and Hohokam Archaeobotanical Record
  - 11:20 Frederick J. E. Gorman, Models of Prehistoric Craft Production: A Contribution from Industrial Archaeology
- Discussants: Mark Cohen, Stan Green

(22) Symposium: THE EXPLANATION OF CERAMIC VARIATION

Columbia Room

Organizer and Chairperson: Ben A. Nelson

Participants:

- 8:30 Florence F. Liman, A Maya Ball Game Vase
  - 8:50 Juan C. Némarić, Ceramics and Trade: Problems in Middle Range Theory
  - 9:10 Diana Kamilli, Applications of Petrography and Electron Microprobe Analysis to the Study of Ancient Ceramics
  - 9:30 Martha A. Latta, A Ceramic Paradigm: Decorative Motifs in the Ontario Iroquois Tradition
  - 9:50 William A. Longacre, Kalinga Pottery, an Ethnoarchaeological Study
  - 10:30 Dorothy K. Washburn, Use of Multidimensional Sealing to Display Sensitivity of Structural Pattern Analysis to Spatial and Chronological Change
  - 10:50 Michael R. Walsh, A Technique for Predicting Vessel Volume Using Sherd Data
  - 11:10 Ben A. Nelson, Information Yield from Vessel Reconstruction: Volume, Form, Function, and Context
  - 11:30 Stephen Plog, Measurement Error in Analyses of Ceramic Variation
- Discussant: James N. Hill

(23) General Session: OLD WORLD ARCHAEOLOGY

Vancouver Room

Chairperson: Leslie G. Freeman

Participants:

- 8:30 Milla Y. Ohel, Technological Efficiency in Prehistoric ALT Assemblages from Northwestern France and Southeastern England
- 8:45 Harold L. Dibble, Developing Motor Patterns of Upper Pleistocene Hominids: Evidence from the Analysis of Lithic Materials from Tabun Cave (Israel)
- 9:00 Philip G. Chase and Harold L. Dibble, Temporal Changes in Shapes of Flakes from Tabun, Israel
- 9:15 Mark F. Baumler, Analytic Comparability Among Flake Measurement Techniques in Lithic Analysis
- 9:30 Frederick C. Munday, Old Schemes and New Directions: A Consideration of the Usefulness of Bordes' Mousterian Classification System
- 9:45 Anne F. Rogers, Variation in Magdalenian Lithic Assemblages
- 10:00 Lawrence G. Straus and Geoffrey A. Clark, Paleoeology at La Riera Cave, Asturias, Spain
- 10:30 L. G. Freeman, Research on Earlier Magdalenian Lifeways in Cantabrian Spain
- 10:50 M. Zvelebil, Site Catchment Analysis: Advances in the Method Applied to Finnish Data
- 11:10 Antonio Gilman, The Economic Basis of Copper and Bronze Age Change in Southeast Spain
- 11:25 Alice M. Choyke, Analysis of Bone/Antler Tools in a Metal Using Society
- 11:35 Curtis N. Runnels, Lithic Technology in the Iron Age

(24) Symposium: COAST TO COAST: COMPARATIVE MARITIME ADAPTATIONS

Social Suite East

Organizer and Chairperson: David R. Yesner

Participants:

- 9:00 David Sanger, Towards a Model of Marine Adaptation: Research in the Gulf of Maine
- 9:20 David R. Yesner, Human Biogeography and Insular Adaptation in the Casco Bay Region, Southwestern Maine
- 9:40 John R. Cross, Seasonality of Shellfish Utilization in Boston Harbor
- 10:00 Steve Wilke, Prehistoric Cultural Response to Environmental Change in the Upper Chesapeake Bay Area
- 10:40 Leonard C. Ham, Seasonality of Shellfish Layers and Variation in Subsistence Activities at a Northwest Coast Site
- 11:00 Richard Ross and S. L. Snyder, Riverine Adaptations on the Central Oregon Coast
- 11:20 M. A. Glassow and L. R. Wilcoxon, A Comparison of Aboriginal Coastal Adaptations North and South of Point Conception, California

(25) Symposium: DIRECTIONS IN FAUNAL ANALYSIS AND ZOOARCHAEOLOGY

Tweedsmuir Room

Organizer and Chairperson: Richard W. Casteel

Participants:

- 8:30 Stanley J. Olsen, Archaeologically, What Constitutes an Early Domestic Animal?
- 8:50 Anne M. Rick, Some Problems and Solutions in Zooarchaeological Interpretation of Bird Bones
- 9:10 Richard G. Klein, Derivation and Interpretation of Age Profiles for Hypsodont Ungulates in Archaeological Faunal Samples
- 9:30 Richard C. Holtzman, Maximum Likelihood Estimates of Relative Abundance in Vertebrate Fossil Assemblages - *Paleobiology*
- 10:10 Donald K. Grayson, Archaeological Vertebrates and Paleoenvironmental Reconstruction
- 10:30 Richard W. Casteel, Ethnoarchaeology and a Test of Some Basic Zooarchaeological Precepts
- 10:50 James S. Oliver and David Von Endt, A Historical Procedure for Identifying the Antlers of Caribou, Moose, Elk, and Virginia Deer: A New Tool for Archaeologists
- 11:10 Danny N. Walker and George C. Frison, The Continual Domestication of Wolf/Dog Hybrids on the Northwestern Plains

(26) Symposium: MAYAN ETHNO-ARCHAEOLOGY AND ETHNO-HISTORY

British Room

Organizer and Chairperson: Brian Hayden

Participants:

- 9:00 Thomas A. Lee, Jr., The Long Path to Extinction: Colonial Coxoh Mayas of Chiapas, Mexico
- 9:20 Susan Blake, House Material Type Variation in Highland Chiapas Mayan Communities
- 9:40 Michael Blake, The Relationship between Household Material Culture and Social Processes in a Modern Tzeltal Mayan Community
- 10:20 Geoffry Spurling, Occupational Specialization and Material Culture
- 10:40 Michael Deal, Ritual-Use Pottery in an Ongoing Cultural System
- 11:00 Brian Hayden, Interaction Theory: Another Missing Link

11:00- SOCIETY FOR HISTORICAL ARCHAEOLOGY

1:30 Room 201

Meeting of the Board of Directors

12:00- COMMITTEE ON PUBLIC ARCHAEOLOGY

1:00 Tweedsmuir

Executive Session

TUESDAY AFTERNOON, APRIL 24

(27) General Session: CURRENT RESEARCH IN LATIN AMERICA AND THE SOUTHWEST

Tweedsmuir Room

Chairperson: William R. Fowler, Jr.

Participants:

- 2:00 Nancy L. Hamblin, The Magic Toads of Cozumel
- 2:15 Anabel Ford, Economic Organization of the Rural Classic Maya
- 2:30 Karen Olsen Bruhns, Cihuatlan, El Salvador: The 1978 Season
- 2:45 Earl H. Lubensky and William R. Fowler, Postclassic Ceremonial Structures of Central El Salvador
- 3:00 William R. Fowler, Jr., Evidence of Formative Period Human Sacrifice at Chalchuapa, El Salvador
- 3:30 Laurie Blank-Roper, Raw Materials and Changes in Socio-Cultural Complexity: Pinedale, Arizona
- 3:45 Kevin Rafferty, The Gila Butte Site: A Study of the Dynamics of Site Growth and Social Stratification Among the Hohokam

(28) Symposium: CURRENT RESEARCH IN COSTA RICAN ARCHAEOLOGY

British Room

Organizers and Chairpersons: Frederick W. Lange, Michael J. Snarkis, and Oscar Fonseca Z.

Participants:

- 1:00 Lynette C. Norr, Stone Burial Mounds and Petroglyphs: Preliminary Investigations in the Rio Naranjo-Bijagua Intermontane Valley, Costa Rica
- 1:20 Winifred Creamer, Report on Preliminary Survey in the Upala Area (Alajuela), Costa Rica
- 1:40 Peter R. Ryder, Preliminary Study of the Guayabo de Bagaces Region, Guanacaste, Costa Rica
- 2:00 Suzanne Abel-Vidor, Two Hearth-Like Features at the Vidor Site, Bay of Culebra, Guanacaste
- 2:20 Jean-Francois Moreau, The "Inland" Occupation on the Pacific Coast of Pre-historic Northwestern Costa Rica
- 2:40 Henry D. Wallace, A Late Middle Polychrome (A.D. 1000-1200) Burial from the Site of Nacascolo, Bahia Culabra
- 3:20 Richard M. Accola, Polychrome Ceramics and Classification in Guanacaste Prehistory
- 3:40 Mark M. Graham, Symbolic Agriculture: Utilitarian Sources of Elite Art in Guanacaste Province, Costa Rica
- 4:00 Michael J. Snarkis, Excavation of an El Bosque Phase House (A.D. 1-500) in Eastern Costa Rica
- 4:20 Oscar Fonseca Z., Guayabo de Turrialba: Reexcavacion de un Sitio Arquitectonico del Atlantico Costarricense

(29) General Session: CURRENT RESEARCH IN THE EASTERN UNITED STATES

Waddington Room

Chairperson: Patricia O'Brien

Participants:

- 1:30 James P. Gallagher, The Dayton Site, a Fortified Village in Southwestern Wisconsin
- 1:45 Richard B. Stamps, New Examples of Perforated Crania in Southeastern Michigan
- 2:00 Philip H. Salkin, The Position of Western Connecticut in the Prehistory of Southern New England
- 2:15 Bruce F. Ball, A Study of Surface Collections from Archaic Sites in Western Kentucky
- 2:30 Wesley C. Cowan and Richard I. Ford, Early Agriculture: Evidence from Cloudsplitter Rock Shelter, Kentucky
- 2:45 Drexel A. Peterson, Jr., Middle Archaic Cultigen from Mississippi
- 3:00 Karl T. Steinen, Land Utilization and Site Distribution in the South Appalachian Province: The West Georgia Piedmont
- 3:30 C. Roger Nance, Statistical Analysis of Lithic Materials from the O'Neal Site, Jefferson County, Alabama
- 3:45 A. Frank Servello, Site 16SA50: A Terminal Pleistocene Multi-Component Site in West-Central Louisiana
- 4:00 C. Michael Barton, Terminal Pleistocene Environmental Change and Human Adaptation
- 4:15 Claire C. Gordon, Soil PH, Bone Preservation, and Sampling Bias at Mortuary Sites
- 4:30 Victoria Dirst, Faunal Remains from Sauer Resort

(30) Symposium: THE AGGRESSIVE FIELD LAB

Social Suite West

Organizers and Chairpersons: Jacqueline Nichols and June L. Evans

Participants:

- 1:30 Dean R. Snow, Putting Lab Work in Its Place
- 1:50 Jacqueline Nichols, The Demands of an Efficient Archaeological Field Lab
- 2:10 Barbara A. McMillan, The Interplay of Archaeologist and Conservator
- 2:30 Sydne B. Marshall, The Land Manager and the Archaeology Lab
- 2:50 Glenda F. Miller, Field Recovery and Preservation
- 3:30 Karen Ann Kraly, Computerized Management of Archaeological Data Bases
- 3:50 Richard J. Dent, Ecological Anthropology and the Aggressive Field Laboratory
- 4:10 June L. Evans, The Site-Specific Lab and Field Manual: A Guide for the Perplexed
- Discussant: Mark Barnes

(31) Symposium: CURATION OF ARCHAEOLOGICAL COLLECTIONS

Vancouver Room

Organizer and Chairperson: Andrea L. Novick

Participants:

- 2:00 Mary Elizabeth King, Curators and Collections: Ethics and Obligations
- 2:20 Alexander J. Lindsay and Glenna Williams-Dean, An Evaluation of Archaeological Collections Management Practices

- 2:40 Andrea Lee Novick, Curation of Documentation  
 3:00 U. Vincent Wilcox, Computerized Collections Management  
 3:30 Richard I. Ford, Storage of Archaeological Collections  
 3:50 Barbara Conklin, New Storage at the American Museum of Natural History—Balancing Change and Continuity  
 Discussants: Ann Hitchcock, J. J. Brody
- (32) General Session: ETHNOHISTORY AND CULTURE HISTORY OF NORTH AMERICA  
 Social Suite East  
 Chairperson: Carlyle S. Smith  
 Participants:  
 1:30 Ann M. Early, Trace Element Analysis of Turquoise Artifacts and Raw Materials from Southwest Arkansas  
 1:50 Michael P. Hoffman, Changing Mortuary Patterns in the Little River Region, Arkansas  
 2:10 Randolph E. Donahue, Land-Use of the "High Country" in Northwest California  
 2:30 Robert F. Maslowski, Moorehead Cave: An Example of Coahuiltecan Continuity in Trans-Pecos Texas  
 3:10 Carlyle S. Smith, The Northward Movement of the Arikara in South Dakota  
 3:30 Thomas E. Emerson and Patrick Willey, Warfare Among 15th Century Agriculturalists in the Missouri River Valley of South Dakota  
 3:50 William A. Turnbaugh, Calumet Ceremonialism as a Nativistic Response  
 4:10 W. Lee Minnerly, La Sault de Sainte Marie: A Study of Spatial Dynamics on an Urban Frontier  
 4:30 James Boone, Artifact Deposition and Demographic Change in a European Colonial Settlement  
 4:50 Alan G. Marshall, The Socioeconomic Bases of Nez Percé Settlements and Settlement Pattern
- (33) Symposium: THE BEHAVIORAL SIGNIFICANCE OF ARTIFACT PATTERNING, "NON-SITE," "SITE," AND INTERNAL SITE STRUCTURE  
 Columbia Room  
 Organizer: Lewis R. Binford  
 Chairperson: Lawrence Straus  
 Participants:  
 1:30 Dana Beth Anderson, Sources of Patterning in Spatial Distributions  
 1:50 Alison Brooks and John E. Yellen, Determinants of Site Patterning among Kalahari Sand  
 2:10 Robert Foley, A Regional Approach to the Structure of Archaeological Materials  
 2:30 Timothy Seaman, Internal Site Structure of the Kakinya and Rulland Sites  
 2:50 James O'Connell, Site Structures and Dynamics Among Modern Alyawara Hunters  
 3:50 Diane P. Gifford, The Third Dimension in Site Structure  
 4:10 Lewis R. Binford, Site Structure as a Clue to Site Function  
 4:30 Robert Whallon, Multilevel Clustering
- 5:30 SOCIETY FOR AMERICAN ARCHAEOLOGY ANNUAL BUSINESS MEETING  
 Pacific Ballroom  
 Cynthia Irwin-Williams, President  
 Address by Chris Delaporte, Director, Heritage Conservation and Recreation Service

## TUESDAY EVENING, APRIL 24

- 8:00- RECEPTION FOR NEW MEMBERS  
 9:00 Tweedsmuir  
 Reception hosted by present and past Society officers for new members and members attending their first annual meeting.
- 8:00- SOCIETY OF PROFESSIONAL ARCHEOLOGISTS  
 10:00 Social Suite East  
 Annual Business Meeting

- (34) SAA/CAA Joint Symposium: THE EARLY PERIOD IN NORTHWEST COAST PREHISTORY  
 Hotel Georgia  
 Organizer and Chairperson: Roy L. Carlson  
 Participants:  
 8:30 Roy L. Carlson, The Early Period on the Central Coast of British Columbia  
 8:50 William Mathews, Glacial Conditions Limiting Human Habitation on the Northwest Coast  
 9:10 Carl Gustafson, R. D. Daugherty, and Delbert Gilbow, The Manis Mastodon Site: Early Man on the Olympic Peninsula  
 9:30 Garland F. Grabert, Pebble Tools and Time Factoring  
 9:50 Catherine Carlson, Early Non-Shell Components from Port Hardy, British Columbia  
 10:30 Robert E. Ackerman, T. D. Hamilton, and Ralph Stuckenrath, Early Cultural Complexes on the Northern Northwest Coast  
 Discussants: C. E. Borden, Knut Fladmark, James Hester, Philip Hobler
- (35) SAA/CAA Joint Symposium: RECENT RESEARCH IN ESKIMO ARCHAEOLOGY I  
 British Room  
 Organizers and Chairpersons: Wendy H. Arundale and Peter Schlederman  
 Participants:  
 8:30 B. C. Gordon, Functional Analysis and Suggested Nomenclature of Burins and Burin-Related Tools  
 8:50 P. Schledermann, Cultural Developments on the East Coast of Ellesmere Island, N.W.T.  
 9:10 R. McGhee, Analysis of Stone Tools from Devon Island (not exact title)  
 9:30 J. Helmer, Early Dorset in the High Arctic: A Report from Karluk Island, N.W.T.  
 9:50 B. Wallace, New Results from L'Anse aux Meadows Site, Newfoundland  
 10:20 W. Fitzhugh, Torngat Archaeological Project: 1978 Field Report and Preliminary Conclusions  
 10:40 R. Jordan, Preliminary Excavation Results of the Middle Dorset Occupation in the Avayalik Island Region, Extreme Northern Labrador  
 11:00 Susan Kaplan, Neoeskimo Occupation of Northern Labrador  
 11:20 C. Lazenby, Prehistoric Exchange of Chert in Labrador: a Preliminary Report  
 11:40 Steven L. Cox, The Large and the Small—A View of Dorset Economy
- (36) SAA/CAA Joint Symposium: THE ORIGIN AND DEVELOPMENT OF JOMON PREHISTORY IN SOUTHWEST HOKKAIDO: THE OSHIMA PENINSULA  
 Hotel Georgia  
 Organizers and Chairpersons: William Hurley and Peter Bleed  
 Participants:  
 9:00 Peter Bleed and M. Yoshizaki, The Yagi Project: Undertaking in Cross Cultural Archaeology  
 9:20 William M. Hurley and M. Yoshizaki, Relationships between the Yagi and the Hamanasuno Sites  
 9:40 Gary Crawford, The Paleoethnobotany of Coastal Oshima Peninsula, Hokkaido  
 10:20 R. M. Farquar, L. Pavlish, and C. Fawcett, The Thermoluminescence (TL) Evaluations of the Hamanasuno and Yagi Sites  
 10:40 John Weymouth, Proton Magnetometer Survey of the Yagi Site  
 11:00 Anthony Davis, Pollen Analyses from Hokkaido Jomon Sites  
 Discussant: Fumiko Ikawa-Smith
- (37) Symposium: WET/FROZEN ARCHAEOLOGICAL SITES—THE STRATEGIES, TECHNIQUES, RESEARCH, AND POTENTIAL  
 Columbia Room  
 Organizers and Chairpersons: G. F. MacDonald and D. R. Croes  
 Participants:  
 8:00 Robert R. Janes, B. Walker-Yorga, C. E. S. Hett, M. Weaver, and R. Lemon, The Archaeology and Conservation of a Frozen Historic Site in the Canadian High Arctic  
 8:15 Larry Titus, The Problems and Potential of a Waterlogged and Frozen Thule Site on Herschel Island, Yukon Territory  
 8:30 Robert D. Shaw, Jewels of the Permafrost: Frozen Wood and Rotten Leather



- 8:45 Dale R. Croes, Ozette Village and Hoko River Wet Sites: 3,000 Years of Northwest Coast Prehistory  
 9:00 J. Jeffrey Flenniken, Replicative Systems Analysis of the Hafted Lithic Artifacts from the Hoko River Wet Site  
 9:15 Ricky Hoff, Fishing with Replicated Wet Site Fishhooks  
 9:30 Kathryn Bernick, Little Qualicum River Wet Site, Vancouver Island, British Columbia  
 9:45 Jamie Barbour, Microscopic Identification of Artifactual Plant Materials from the Hoko River Wet Sites  
 10:15 Mary-Lou E. Florian, Analysis and a Comparison of Archaeological Wood Samples from a Frozen and a Wet Site  
 10:30 Barbara Purdy and Raymond F. Willis, Recovery, Preservation, and Study of Wooden Artifacts in Florida  
 10:45 R. W. Neuman, Wetland Archaeology in the Louisiana Coastal Zone  
 11:00 Ross Brand, Wet Site Soil Sections  
 11:15 J. C. McCawley and D. W. Grattan, The Potential of the Canadian Winter Climate for the Freeze Drying of Degraded Waterlogged Wood  
 11:30 Charles E. S. Hett, Planning a Frozen Site Excavation: A Conservator's Viewpoint  
 11:45 Greta Hansen and Susan Paterson, Conservation of Middle Dorset Wet Organic Specimens from Northern Labrador, Canada  
 12:00 Sharon Fetter, Successful Use of Brown's Preservative in Alaska  
 12:15 Emily Hartley, An Evaluation of Various Methods of Wet Wood Conservation

## (38) General Session: CURRENT RESEARCH IN METHOD AND THEORY

Social Suite West

Chairperson: Michael B. Schiffer

Participants:

- 8:15 Barbara D. Stafford, A Comparison of Macro- and Microwear Functional Analysis of Lithics  
 8:30 Donald O. Henry, Quantitative Aspects of a Lithic Reduction Sequence  
 8:45 Kathleen Cooper Henry, The Effects of Differential Recovery Strategies on Chipped Stone Assemblages  
 9:00 Howard J. Pomerantz, The Origins of Domestication: An Explicitly Objective Approach to the Problem  
 9:15 Thomas K. Black, The MMD and Population Distance  
 9:30 Calvin H. Jennings, Proton Magnetometer Applications in Open Hunter-Gatherer Sites  
 9:45 Alan H. Simmons, Potential Problems with Non-Destructive Resource Evaluation Responses  
 10:00 Shereen A. Lerner, The Effects of Natural Boundaries on Settlement Systems and Interaction  
 10:30 Brian F. Byrd, Surface and Subsurface Artifact Variability  
 10:45 Kathryn A. Kamp, Ethnicity in the Archaeological Record  
 11:00 Michael B. Schiffer, The Effects of Occupation Span on Site Content: A Simulation Approach  
 11:15 Jefferson Reid, When Archaeology Fails  
 11:30 Katharine Fernstrom, The Effects of Subsistence Stress on Exchange Networks  
 11:45 Shirley Powell, Predicting Structures on Small Artifact Scatters

## (39) General Session: CULTURAL RESOURCE MANAGEMENT AND PUBLIC ARCHAEOLOGY

Waddington Room

Chairperson: William McHugh

Participants:

- 9:00 Alice W. Portnoy and W. J. Mayer-Oakes, Determining Archaeology: Agency Orientations  
 9:20 Joseph L. Chartkoff and Kerry K. Chartkoff, Archaeology *In Cathedra*: The Go Road Project  
 9:40 William J. Mayer-Oakes, Concepts of Theory in Operational Archaeology  
 10:00 Henry F. Cleere, Archaeology and Land-Use Planning in Britain  
 10:40 T. H. Bianchi, Developing a Cultural Resources Management Program for Crisis Conditions  
 11:00 Frederick W. Lange, Dammed Tourists in Costa Rica: Cultural Resource Management in a Developing Nation  
 11:20 Stephen Whitecotton, Efficient Management in Conservation Archaeology Projects  
 11:40 Richard E. Ross and Esther Stutzman, Indians and Archaeologists: Avoiding the Circled Wagon Train Syndrome

## (40) General Session: SUBSISTENCE STRATEGIES AND ADAPTATION

Social Suite East

Chairperson: Gregory G. Monks

Participants:

- 8:30 Van A. Reidhead, Hunter-Farmers in Eastern North American Prehistory: The Limits to Growth  
 8:50 Marjory W. Power, The Winooski Site: A Test Case for a Middle Woodland Settlement Subsistence Model  
 9:10 Gregory G. Monks, The Procurement System Concept: Modifications and Operationalization  
 9:30 Robin S. Futch, Human Ecology at the Morton Shell Mound Site, Louisiana  
 9:50 James D. Wilde, Northern Great Basin Sedentism: A Preliminary Reevaluation of Catlow and Roaring Springs Caves in Southeastern Oregon  
 10:30 Christopher J. Jurgens and Alston Thoms, Settlement Pattern and Environmental Adaptation at Choke Canyon Reservoir, Texas  
 10:50 Carl D. Spath, Post-Pleistocene Coastal Geomorphology of the Guayas Estuary and Its Significance to Andean Culture History  
 11:10 Becky Saleeby and Candace Levy, Prehistoric and Historic Usage of Faunal Resources on Easter Island  
 Discussant: Kent Flannery

## (41) General Session: CURRENT RESEARCH IN THE WESTERN UNITED STATES

Tweedsmuir Room

Chairperson: Elizabeth Ann Morris

Participants:

- 8:15 Wayne E. Wiersum, Outhouse Archaeology: The IHS Sanitation Program and Archaeology Policy in Native Communities in Rural Alaska  
 8:30 Lynda E. Spickard, Northwest Coast Resource Abundance: Ethnographic Fact or Prehistoric Fiction?  
 8:45 Richard C. Hanes, Lithic Technology in the Owyhee Uplands, Oregon  
 9:00 Michael D. Metcalf and P. A. Treat, Continuity in Late Prehistoric Period Pronghorn Procurement in Southwestern Wyoming  
 9:15 Thomas K. Larson, Bone Projectile Points Recovered from the Folsom Level at the Agate Basin Site  
 9:30 Max G. Pavesic, Recent Findings at the Braden Burial Site, Western Idaho  
 10:00 Lee Sappington, The Lydle Gulch Site: Obsidian Selection and Procurement in the Northern Great Basin  
 10:30 James R. Marcotte, Manufacturing and Use Wear Patterns Within a Single Projectile Point Type  
 10:45 Elizabeth Ann Morris and Daniel R. Mayo, Current Research at the Lightning Hill Site (5-LR-284), North-Central Colorado  
 11:00 Mark E. Miller, Prehistoric Site Locations in North Park, Jackson County, Colorado  
 11:15 Alston V. Thoms, Cultural Resource Contracts and Environmental Consulting Firms: An Oklahoma Example  
 11:30 A. Trinkle Jones, A Classification of Projectile Points from the Southern Grand Canyon Region  
 11:45 Anne B. Justen, Microwear Patterns on Bifaces

## (42) Symposium: ASPECTS OF LITHIC TECHNOLOGY

Vancouver Room

Organizers and Chairpersons: Terry A. Del Bene and Gerald A. Holley

Participants:

- 8:30 Gerald C. Hedlund, Lithic Materials from Inland Cultural Sites on the Enumclaw Plateau in Western Washington  
 8:50 John S. Cable and Rachel Most, The Bi-Polar Technique, Error or Adaptation?  
 9:10 Joyce C. White and Chester F. Gorman, Patterns in "Amorphous" Industries: The Hoabinhian Viewed Through a Lithic Reduction Sequence  
 9:30 Georgeanne L. Reynolds and William S. Laughlin, Phase Analysis of Anangula Cores and Its Application to Lithic Studies  
 9:50 Jeremiah F. Epstein, Conjuring Up the Future  
 10:30 Guy R. Muto, Edge Damage: The Other Possible Causes  
 10:50 Gerald A. Holley, Microwear: An Observation of Scale  
 11:10 L. Lewis-Johnson, Manufacturing Sequences vs. Stone Tool Use: An Evaluation of Prospective Success in Prehistoric Interpretation  
 11:30 Terry A. Del Bene, Handedness and Burin Manufacture: An Experimental Study

- 11:45 George H. Odell, The Experimental Use of Stone Projectile Points: Some Implications for the Functional Analysis of Prehistoric Artifacts

**WEDNESDAY AFTERNOON, APRIL 25**

(43) SAA/CAA Joint Symposium: PREHISTORIC CULTURE CHANGE ON THE NORTHWEST COAST OF NORTH AMERICA

British Room  
Organizer and Chairperson: Kenneth M. Ames

Participants:

- 1:30 Knut Fladmark, A Paleocological Model for Northwest Coast Prehistory Re-Examined  
1:50 Randall Schalk, Variation in Home Range Size in Aboriginal Northwest Coast Societies  
2:10 Paul Gleeson, Mark Fleischer, and Geoffry Gamble, Economic Roles of Nootkan Intra-house Ranked Positions  
2:30 Gail Thompson, Prehistoric Subsistence Settlement Changes in the Southern Northwest Coast  
2:50 Garland Grabert, Inland Sites of the Central Northwest Coast Area  
3:30 David V. Burley, Specialization and the Evolution of Complex Society in the Gulf of Georgia  
3:50 George E. MacDonald and Richard Inglis, Change and Continuity in North Coast, British Columbia, Woodworking, a 3000 Year Perspective  
4:10 Phillip Drucker, A Techno-Ecological Model of Northwest Coast Resource Exploitation  
4:30 Kenneth M. Ames, The Evolution of Rank Societies on the Northwest Coast

(44) SAA/CAA Joint Symposium: RESEARCH IN ESKIMO ARCHAEOLOGY II

Hotel Georgia  
Organizers and Chairpersons: W. Arundale and P. Schliedermann

Participants:

- 1:30 C. D. Arnold, Cultural Affinities of the Lagoon Site  
1:50 C. Hickey, Nineteenth Century Copper Eskimo Economics  
2:10 J. Cinq-Mars and W. Irving, A Consideration of Eskimo and Eskimoid Archaeological Remains in the Crow Basin, N.W.T.  
2:30 B. W. Yorga, Western Thule and Mackenzie Eskimo Origins  
2:50 T. Lorenz, Turner Overlook Fauna  
3:20 K. Schoenberg, The Archaeology of the Utukok River, Alaska  
3:40 H. Shields, Prehistoric Land Use Patterns in the Western Brooks Range  
4:00 M. Nowak, Ocher and Ocean Bay  
4:20 M. Yarborough, A Site on Every Flat Spot  
4:40 W. Workman, J. Lobdell, and K. Workman, Recent Archaeological Work in Kachemak Bay, Gulf of Alaska

(45) SAA/CAA Joint Symposium: PRE-CLOVIS EVIDENCE OF MAN IN NORTH AMERICA

Waddington Room  
Organizer and Chairperson: George C. Frison

Participants:

- 2:00 James M. Adovasio, Meadowcroft Rockshelter: Retrospect 1978  
2:20 Robson Bonnichsen, The Pre-Projectile Point to Projectile Point Transition  
2:40 Alan Bryan, A Directed Search for "Pre-Clovis" Man  
3:00 Steven Chomko, Late Pleistocene Environments and Man in the Western Big Horn Mountains, Wyoming  
3:30 Richard E. Morlan, Upper Pleistocene Archaeology, Paleontology, and Stratigraphy in Northern Yukon Territory  
3:50 Michael Reagan and Ralph Rowlett, An Early Man Site in Northwest Missouri  
4:10 L. Shaw and G. C. Frison, Evidence for Pre-Clovis in the Bighorn Basin  
4:30 D. Stanford and J. Albanese, The Dutton and Selby Sites, Colorado; Evidence for Pre-Clovis Occupation of the High Plains and Geologic Setting at Dutton and Selby  
Discussant: Marie Wormington

(46) General Session: THE ARCHAEOLOGY OF COMPLEX SOCIETIES

Social Suite East  
Chairperson: Robert J. Squier

Participants:

- 1:30 Charles Dickson Trombold, Toward an Empirical Delineation of Settlement Hierarchies in Complex Societies  
1:50 George L. Cowgill, Politico-Economic Factors in the Disintegration of Early States  
2:10 Robert M. Schacht, Processual Change in Empires  
2:30 René R. Gadacz, Pre-Conquest Trade Organization in Tabasco, Mexico  
2:50 H. Barry Holt, Troop Garrisons: Their Existence and Role in Aztec Military Policy  
3:30 Frederick Lamp, Sahagún Reconstructed: A Legend of Five Suns  
3:50 Mary Ellen Miller, Central Mexican Myth in the Popol Vuh  
4:10 Charles Edward Lincoln, The Structure of Mayoid Society, Based on Excavations at Travesia  
4:30 Izumi Shimada, Behind the Golden Mask: The Archaeology of Batan Grande

(47) Symposium: GEOARCHAEOLOGY

Columbia Room  
Organizer and Chairperson: Fekri A. Hassan

Participants:

- 1:30 Karl W. Butzer, The Scope of Geoarchaeology  
1:50 Lambert Dolphin, Geophysical Prospecting in Archaeology  
2:10 Afifa Afifi Hassan and F. A. Hassan, The Mineralogy and Geochemistry of Archaeological Sediments  
2:30 John C. Kraft, Geological Analysis of Coastal Archaeological Sites  
2:50 Bruce G. Gladfelter, Geomorphic Contributions to Archaeological Interpretations in a Floodplain Setting  
3:30 Robert I. Folk, Tell Yinam, Galilee, Israel  
3:50 Jack Donahue and J. M. Adovasio, Geological Investigations at Meadowcroft Rockshelter  
4:10 John A. Gifford and George R. Rapp, The Archaeological Geology of Troy  
4:30 Fekri A. Hassan, Geology and Subsistence—Settlement Studies in Archaeology  
Discussants: K. W. Butzer, Michael Schiffer

(48) General Session: AGRICULTURAL SYSTEMS IN THE SOUTHWEST

Tweedsmuir Room  
Chairperson: Donald E. Weaver, Jr.

Participants:

- 1:30 Anne I. Woosley, Agricultural Diversity in the Southwest  
1:50 Michael E. Whalen, A Comparative Evaluation of Pithouse and Pueblo Subsistence Systems in South-Central New Mexico  
2:10 David E. Doyel, Pueblo II Period Settlement and Subsistence in the Upper Little Colorado Region, East-Central Arizona  
2:30 Glen E. Rice, Modeling Microenvironmental Reduction  
3:10 Paul E. Minis, An Archaeological Perspective on Food Stress  
3:30 Donald E. Weaver, Jr., Economizing, an Explanation for Anasazi Abandonment  
3:50 Roberta Jewett, The Effect of Drought on Prehistoric Agricultural Populations in the Southwest: An Overview

(49) Symposium: SPATIAL ANALYSIS IN OLD WORLD ARCHAEOLOGY: SOME METHODOLOGICAL CONSIDERATIONS

Sponsoring Organization: American Association for Field Archaeology  
Vancouver Room  
Organizer and Chairperson: Eugene L. Sterud

Participants:

- 2:00 Stephen L. Dyson, Problems and Possibilities in the Reconstruction of Romano-Italian Settlement History  
2:20 H. A. Bankoff and F. A. Winter, A Strategy for Regional Survey in Temperate Zone Environments: The Morava Valley Project  
2:40 Ian Hodder, Refuse and Models of Within-Site Spatial Patterns  
3:20 A. Ammerman, J. McDonough, and K. Quilty, Interpreting Neolithic Settlement Patterns in the Acconia Area of Calabria  
3:40 Mark Clymer and Eugene Sterud, Applications of Electronic Surveying, Mapping, and Data-Recording Equipment to Studies of Spatial Phenomena

(50) Symposium: THE LATE HOLOCENE OF THE SOUTHERN PLAINS

Social Suite West

Organizers and Chairpersons: Don O. Henry and Terry Prewitt

Participants:

- 2:00 Arthur H. Rohn, Don Blakeslee, and Sam Heitha, Environmental Reconstruction for Hillsdale Lake, Kansas
- 2:20 K. J. Buehler and S. C. Vehik, A Preliminary Model Relating Changes in Prehistoric Settlement-Subsistence Systems to Climatic Changes in North-Central Oklahoma
- 2:40 Terry Prewitt, Systemic Overview of Paleoclimatic Fluctuations in North-Central Oklahoma
- 3:20 Steve Hall, Pollen Evidence for Late Holocene Environments in the Southern Plains
- 3:40 Foster Kirby, Gastropod Evidence for Late Holocene Environments in the Southern Plains

5:00- SOCIETY FOR ARCHAEOLOGICAL SCIENCES

6:00 Tweedsmuir

First Annual Business Meeting

THURSDAY MORNING, APRIL 26

9:00 SOCIETY FOR AMERICAN ARCHAEOLOGY

Garibaldi

Meeting of the Executive Committee

ABSTRACTS OF SYMPOSIA

(1) PRELIMINARY RESULTS OF THE INTERDISCIPLINARY INVESTIGATIONS IN THE AYACUCHO VALLEY IN HIGHLAND PERU. This symposium is intended to present the preliminary results of the interdisciplinary investigations conducted from 1969 through 1972 in the Ayacucho Valley, in highland Peru. Two of the research goals were to investigate the beginnings of the domestication of plants and animals and the emergence of sedentism in the Ayacucho Valley, Peru. Coprolite analysis and faunal analysis as presented here relate to the domestication problem. A method for detecting prehistoric use of maize is discussed. Seasonally specific sites are also discussed. In addition, information on paleoclimatology, functional analysis, and lithic technology is reported here. A summary of the cultural implications of the Peruvian preceramic is also included.

(2) EXPERIMENTAL DATA SETS AND HUMAN BEHAVIOR: PREDICTIVE AND ANALYTICAL DIRECTIONS. Archaeological experimentation has dealt primarily with the duplication of human behavior. Without explicit theoretical foundation and methodological controls, however, experimental results will not necessarily provide relevant information for more general anthropological questions. By making explicit the theoretical framework of an experiment, its associated assumptions can be strengthened by experimental and other empirical justification. This symposium will discuss the design and initial results of archaeological experiments aimed at controlling variables affecting human behavior and generating archaeologically testable data sets. Experimental contexts include computer simulation, laboratory and field experiments, and analytic methods.

(3) THE ARCHAEOLOGY OF THE LOWER COLUMBIA RIVER REGION. The archaeology of the Lower Columbia River region is approaching the end of one phase and the beginning of another. The basic culture history and chronology have been largely worked out, and the time is ripe for a review and synthesis of past and current work and an effort at charting and organizing directions and goals for future, problem-oriented research. The aim of this symposium is to present such a review and provide a forum for those involved in the archaeology of this region to exchange ideas and information on the questions and problems to be approached in the coming years.

(4) RESEARCH DESIGN IN CULTURAL RESOURCE MANAGEMENT. Cultural resource management is entirely the result of legislation over the past several years. The program has been good for the preservation of archaeological values; however, the research objectives of American archaeology got left behind as historic preservation surged ahead. Research is crucial to archaeology; otherwise there is no point to the discipline. But the proponent of cultural resource management, the federal government, is not a research organization. Herein lies the problem of research in contract work. Research goals must be sensitive to the needs of land developers, federal land managers, and archaeologists.

(5) PREHISTORIC CRAFT PRODUCTION (SESSION I). The symposium theme is the use of archaeological data in the analysis of modes of production. The specific focus will be the interrelationship between social organization and nonagricultural production. Papers deal with the following topics: (1) recognition of specific forms of organization of production (e.g., craft versus domestic) using archaeological data, (2) the interpretation of the relationship between prehistoric social organization and production, and (3) the development of general models for the analysis of prehistoric modes of production. Because of the nature of the archaeological record, most of the papers will examine ceramic production, although some papers concern other goods.

(6) RADAR IN ARCHAEOLOGY. The growing pressure to conduct archaeological survey investigation with both speed and efficiency in response to increasing federal and state legislation has created a demand for more sophisticated archaeological technology. The recent testing of subsurface radar, in both prehistoric and historic settings, shows definite promise in this connection.

(9) ECOLOGICAL AND EVOLUTIONARY IMPLICATIONS OF SETTLEMENT SYSTEMS IN PREHISPANIC MESOAMERICA. This symposium examines cultural adaptation as expressed by changing patterns of Mesoamerican settlement systems. The papers, drawn from all major cultural regions of Mesoamerica, present data derived from recent field research. Although all the papers share a basic concern with settlement system analysis, they focus on two basic analytical approaches: (1) the analysis of the role of the natural environment and the application of spatial models and (2) the explanation of population distribution in time and space.

(10) ARCHAEOLOGY IN NORTHERN BELIZE: THE CUELLO PROJECT. Northern Belize has recently been the focus of several important research projects in Maya archaeology, among them

the British Museum-Cambridge University Corozal Project, the British Columbia-Minnesota Rio Hondo Project, and the S.M.U. Cerros Project. This session deals with a fourth such project, investigating the Formative site of Cuello, and presents results from the 1978-1979 excavations in a regional perspective.

(11) RECOVERY FROM THE ILOPANGO VOLCANIC ERUPTION, EL SALVADOR. Ilopango Volcano in central El Salvador erupted explosively during the third century A.D. and caused a major natural disaster within a 100-km radius. Field and laboratory research of the Protoclassic Project in 1978 was directed toward understanding specific recovery processes. These include soil recovery, vegetative recolonization, and human reoccupation (demographic recovery as well as recovery of indigenous ceramic and lithic industries). Partial soil and vegetative recovery two centuries after the eruption allowed for significant human recolonization from the north during the sixth century A.D.

(13) DEATH AND SOCIETY: MORTUARY SITE DATA AND SOCIAL ORGANIZATION. In the more than ten years since the symposium published as *Social Dimensions of Mortuary Practices*, a number of archaeologists have investigated social organization by analysis of mortuary site data. The aim of the present symposium is to examine some of the varied directions that studies in mortuary behavior are currently taking. A collection of data sets is analyzed by a variety of quantitative and methodological techniques to show some of the potential insights into social organization that can be derived from mortuary data.

(14) PREHISTORIC CRAFT PRODUCTION (SESSION II). The symposium theme is the use of archaeological data in the analysis of modes of production. The specific focus will be the interrelationship between social organization and nonagricultural production. Papers deal with the following topics: (1) recognition of specific forms of organization of production (e.g., craft versus domestic) using archaeological data, (2) the interpretation of the relationship between prehistoric social organization and production, and (3) the development of general models for the analysis of prehistoric modes of production. Because of the nature of the archaeological record, most of the papers will examine ceramic production, although some papers concern other goods.

(15) KOSTER: THE EARLY AND MIDDLE ARCHAIC HORIZONS. Since 1969 excavations at the Koster site in the lower Illinois River Valley have produced a series of 21 well-preserved Archaic components. As part of an ongoing program of interdisciplinary research, interest has focused upon 16 Middle Archaic components, and preliminary studies have been made of Horizon 11, an Early Archaic component. The purpose of the present symposium is to summarize the results of specific analyses as well as the results of our attempts to integrate these various sources of data into an interpretive framework for examining the causes of subsistence-settlement change in the Middle Archaic.

(16) NATURAL AND CULTURAL PROCESSES IN THE FORMATION OF AN ARCHAIC SHELL MIDDEN ON THE GREEN RIVER, KENTUCKY. The Green River shell middens, long important to interpretations of eastern U.S. prehistory, have yielded cucurbits dating to 2500 B.C. in an otherwise "forest efficiency" subsistence milieu. Two factors—an apparent lack of clear and consistent horizontal stratification within the middens and a need for a better understanding of the relationship of the middens to the river's floodplain—have combined to dictate a research design integrating geological, paleoecological, and archaeological perspectives in order to understand the processes responsible for shell midden formation. Papers reporting the methodology and results of microstratigraphic, paleoethnobotanical, and geological analyses are followed by an interpretive summary.

(17) ECOLOGICAL MODELS IN ECONOMIC PREHISTORY. Ecological and economic systems share a number of similarities in such areas as resource limitation and responses to resource scarcity, diversity of interactions, spatial characteristics, and structural components. These similarities give both kinds of systems a similar degree of complexity, facilitating the interchange of research tools and theoretical models. This symposium focuses on the common principles underlying both fields and attempts to evaluate their utility in archaeological research. Although ecological and economic theory are not isomorphic, at a general level of description it is felt that the use of a common framework can lead to development of a more powerful theory of cultural evolution.

(18) SESSION SPONSORED BY THE ARCHAEOLOGICAL INSTITUTE OF AMERICA. OLD WORLD ARCHAEOLOGY FOR NEW WORLD ARCHAEOLOGISTS.

(19) HISTORY OF ARCHAEOLOGY. The history of archaeology is restricted to a few books and a handful of articles, consisting mainly of narrative accounts or chronicles of what took place, with

periodification as the major interpretive device. These works are useful and necessary but hardly exhaust the possibility for study. Issues that remain unexamined include "social and political organization" of the discipline; reasons for the timing of innovative developments; relations with other disciplines; relations with living survivors of the archaeological cultures. As a means of stimulating interest in an analytic approach to our discipline, the symposium presents researches on a variety of topics and hopes to generate discussion and debate.

(20) SIMULATION IN ARCHAEOLOGY. Simulations can aid researchers in exploring the dynamics of multivariate methods of demographic or sociocultural stability and change, decision making, formation of the archaeological record, and other processes. They also provide the means for evaluating the effects of varying selected parameters of models, and they facilitate the revision of models so that their predictions more nearly agree with archaeological observations. The symposium papers provide a sampling of current work in archaeological simulation. Because explanation of the models and simulation results does not ordinarily lend itself well to linear, oral presentation, the symposium will take the form of a poster session and scheduled discussion period.

(21) SESSION SPONSORED BY THE AMERICAN SOCIETY FOR CONSERVATION ARCHAEOLOGY. ETHICS OF CONTRACTING. Contracting has been an aspect of American Archaeology for many, many years. In recent years the profession has been faced with every mounting pressure and problem that now require a serious look at "Ethics of Contracting." Some of the major concerns before archaeologists today are the quality of research and reporting, the professional responsibility to the resource and the profession, responsible scheduling, territoriality, resource orientation vs. client orientation, and pricing, including the ethics of using volunteer or tuition-paid labor in a contract situation.

(24) COAST TO COAST: COMPARATIVE MARITIME ADAPTATIONS. Maritime hunter-gatherers form a select subset of hunter-gatherers exploiting abundant and diverse coastal resources and characterized by locally dense populations and complex, semisedentary settlement patterns. With a few exceptions in Africa and Europe, maritime lifeways extend back only to Upper Paleolithic times and have nearly equal antiquity in both Old and New Worlds. With eustatic stabilization of the coastline ca. 3000-6000 B.P., coastal sites became abundant in many parts of North America. Many of these sites exhibit excellent preservation of faunal remains, which may be used for paleoecological reconstruction. The members of this symposium address themselves to three common themes, applying them to archaeological sites on the Atlantic and Pacific coasts of North America: the origins of maritime adaptations; the effects of environmental change on coastal societies; and the nature of prehistoric coastal subsistence and settlement patterns.

(25) DIRECTIONS IN FAUNAL ANALYSIS AND ZOOARCHAEOLOGY. The stimulus for this symposium has been a growing sense of unease regarding attempts by many investigators to utilize faunal materials for a vast number of highly detailed and speculative studies in archaeology. Discussion will center on what it is we believe we are doing, how well we think we can do it, and where our research efforts should be guided in the near future. Such reflection may well be of considerable value at this time. Concentration will be upon major concepts and problems of wide concern within zooarchaeology. Specific topics to be dealt with include domestication, paleoecology and paleoenvironments, aging techniques, and basic problems in quantification.

(26) MAYAN ETHNO-ARCHAEOLOGY AND ETHNO-HISTORY. Results of two seasons of ethnoarchaeological work in the Chiapas Highland, together with related Mayan Colonial site investigations, provide the basis for new archaeological interpretations and orientations. Material correlates of economic specialization and rank, of interaction intensity, and of ritual behavior are presented. Variation in house structure characteristics is related to behavior as well; both house styles and house construction materials are dealt with. All analyses are based on statistical samples of within-village and between-village samples.

(28) CURRENT RESEARCH IN COSTA RICAN ARCHAEOLOGY. With greatly increased government support, the National Museum of Costa Rica has substantially increased research efforts in recent years. Much of the research has focused directly or indirectly on Costa Rica's geographical and cultural position as a "buffer" between Mesoamerican and South American influences. Preliminary results from a number of long-range projects are presented here, including settlement, social, economic, trade, and mortuary patterns; basic chronological problems; cultural resource management efforts; and art historical analyses and interpretations of some of the archaeological data.

(30) THE AGGRESSIVE FIELD LAB. Archaeological field labs are now the locus of the most interesting new tests, analyses, and predictive theories in archaeology. This session will cover the full range of activities associated with a modern field lab, including organization of excavated materials; temporary or emergency field conservation; the application of a comprehensive yet flexible computer storage and retrieval system; and other specific issues of lab strategy. However, the emphasis will be less on what the lab can do than on what it should do. The session will stress interaction with fieldwork and the predictive power of an efficient lab.

(31) CURATION OF ARCHAEOLOGICAL COLLECTIONS. In the past the storage of archaeological collections has not been considered seriously. Recent federal legislation (NEPA, Executive Order 11593, and The Archaeological and Historic Preservation Act PL93-291) requires that archaeological sites be studied and protected. The result has been a tremendous increase in archaeological collections and documentation. Current research into the condition of nonfederal repositories has shown that archaeologists must confront the curation problem. As a start in this direction, the questions of who should curate collections and how they should be managed are discussed here. Since these collections are the future data base, it is essential that ownership, records, and storage be concise and well maintained. It is imperative that archaeologists become involved in the long-term care of archaeological collections and documentation.

(33) THE BEHAVIORAL SIGNIFICANCE OF ARTIFACT PATTERNING, "NON-SITE," "SITE," AND INTERNAL SITE STRUCTURE. This symposium brings together the majority of researchers who have sought to accumulate ethnographically documented site structural information. It seeks to achieve a "state of the art" form of presentation regarding our current understandings of the sources for variability in the distribution of archaeological remains defining sites and regional distributions. The emphasis is upon hunter-gatherer adaptations; however, it is projected that much of what we observe may be of relevance to archaeologists working with peoples practicing forms of food production. Although most archaeologists have assumed that "meaning" could be assigned to spatial distributions of artifacts, little methodology has been developed to facilitate this goal. It is hoped that the comparative discussion of the available "control" data presented here will be a first step in the development of such methodology.

(34) JOINT SAA/CAA SESSION. THE EARLY PERIOD IN NORTHWEST COAST PREHISTORY. This symposium will be devoted to the presentation and evaluation of cultural-historical and cultural-environmental models relevant to Northwest Coast prehistory for the time period greater than 5,000 years ago. The emphasis will be on new information and its bearing on initial settlement, subsistence, and cultural patterns.

(35) JOINT SAA/CAA SESSION. RECENT RESEARCH IN ESKIMO ARCHAEOLOGY I. Current work illuminates poorly known areas such as Ellesmere Island, NPRA, and Northern Labrador. New models and techniques provide a broader understanding of Arctic subsistence and settlement patterns. And the growth of government agency archaeology in Alaska introduces new issues in the conduct of Arctic research. At the same time, investigations of familiar problems in better known areas continue to bear fruit. This symposium will enable far-flung Arctic specialists to exchange current research results and assess emerging developments in their area.

(36) JOINT SAA/CAA SESSION. PRE-CLOVIS EVIDENCE OF MAN IN NORTH AMERICA. In recent years there have been claims for the discovery of a number of new archaeological manifestations suggesting man's presence in North America before the appearance of the Clovis cultural complex. Some of these offer better claims to validity than others because of the nature of the various archaeological contexts involved. This symposium is intended to present the evidence for a number of these claims to in order to encourage more communication between investigators involved in this area of research.

(37) WET/FROZEN ARCHAEOLOGICAL SITES—THE STRATEGIES, TECHNIQUES, RESEARCH, AND POTENTIAL. Water-saturated archaeological sites (wet sites) throughout the world and frozen sites in the northern hemisphere have produced large quantities of well-preserved perishable materials. The recovery of wooden artifacts, basketry, cordage, hafted stone implements, and other items contributes substantially to the overall understanding of regional prehistories. These sites also have required the development of new excavation, preservation, and research tactics. This symposium considers several sites, the techniques that have been developed, and the future potential of wet/frozen site archaeology.

(42) ASPECTS OF LITHIC TECHNOLOGY. The purpose of the proposed symposium is to present a series of papers that cover wide-ranging topics within lithic technology. In the past, symposia have tended to focus on one aspect or another of lithic technology. This symposium will attempt to present papers from as many facets of lithic technology as possible. Papers and discussions will aim at providing information to the specialist, as well as the nonspecialist, in lithic technology.

(43) JOINT SAA/CAA SESSION. PREHISTORIC CULTURE CHANGE ON THE NORTHWEST COAST OF NORTH AMERICA. The evolution of the societies occupying the Northwest Coast of North America at contact is poorly understood despite the role these societies played in the formation and development of North American anthropology. The archaeological record of the coast makes it a particularly appropriate area to explore problems in the development of ranked societies, subsistence and social intensification, and the effects of processes such as population growth and environmental change. The papers in the symposium deal with aspects of these problems, applying primarily new data to local, regional, or general problems of culture change.

(44) JOINT SAA/CAA SESSION. RECENT RESEARCH IN ESKIMO ARCHAEOLOGY II. See (35).

(45) JOINT SAA/CAA SESSION. THE ORIGIN AND DEVELOPMENT OF JOMON PREHISTORY IN SOUTHWEST HOKKAIDO: THE OSHIMA PENINSULA. The origin and development of the Jomon cultural tradition in Japan is known to have spanned some 15,000 years. Western knowledge concerning this tradition is generally centered on information derived from the main island of Honshu or the southern island of Kyushu. Hokkaido is viewed as a marginal island because of its "severe" climate and northern position. Jomon research in Hokkaido has recently shown that its marginality is due only to an absence of multifaceted archaeological investigations. A series of Initial through Middle Jomon sites in the Oshima Peninsula of Southwest Hokkaido has revealed formative cultures surprisingly equal in complexity to those in southern Japan and mainland Asia.

(47) GEOARCHAEOLOGY. Geoarchaeology, the study of archaeological problems from an earth-science perspective, is one of the major currents in contemporary archaeology. The traditional emphasis on dating and paleoenvironmental reconstruction is now supplemented with attempts to deal with activity areas, settlement location, trade networks, diffusion, and site catchment territories. The proposed symposium will present examples of current research in this direction.

(49) SESSION SPONSORED BY THE ASSOCIATION FOR FIELD ARCHAEOLOGY. SPATIAL ANALYSIS IN OLD WORLD ARCHAEOLOGY: SOME METHODOLOGICAL CONSIDERATIONS. This symposium will deal with a number of issues involving spatial analysis. While the main theme is methodological, within that theme there is a considerable variability. Both intrasite and intersite analyses are treated; the geographical coverage in the Old World is great, spanning Britain, Italy, Yugoslavia, Zambia, the Sudan, and Anatolia. Temporally, the studies range from Neolithic to Late Roman. Methodological restraints such as plant cover, geomorphology, patterns of refuse deposition, the limits of recording accuracy, and the very recent shift to a concern for settlement information in some parts of the Old World are covered. Efforts to systematize and effectively gather field data, as well as the matter of interpretation of the data, all come under discussion.

(50) THE LATE HOLOCENE OF THE SOUTHERN PLAINS. The symposium will concentrate on synthesizing recently acquired evidence for environmental reconstructions for the Late Holocene of the Southern Plains. Geological, palynological, and malacological evidence will be integrated into the archaeological record in an attempt to better understand Late Holocene man-land relationships.

## ABSTRACTS OF PAPERS

Abascal M, Rafael (INAH-Hidalgo) PREHISPANIC POTTERY VILLAGES Among the ways to evaluate pre-Hispanic agricultural societies, the most abundant evidence is that which is revealed through the processes of production of material life. In Tlaxcala, Mexico, we have been able clearly to distinguish changes in modes of domestic production. This relates to subsistence and to the more complex forms of production clearly manifested in the social division of labor. In this study, we base our position on the development of ceramic production between 1700 B.C. and time of contact. (5)

Abel-Vidor, Suzanne (Brown and Museo Nacional de Costa Rica) TWO HEARTH-LIKE FEATURES AT THE VIDOR SITE, BAY OF CULEBRA, GUANACASTE: CHARACTERISTICS, CONTEXTS, AND CULTURAL IMPLICATIONS Although "hearths" with good archaeological context are rare in Costa Rica, two were found (1977) during excavations at the Vidor site. Their formal characteristics and spatial relations within the site suggest important cultural implications. Dating to the Zoned Bichrome (300 B.C.-A.D. 300) and Early Polychrome (A.D. 300-800) periods, they are functionally interpreted as an earth oven and an open-pit ceramic kiln, respectively, on the basis of physical traits and comparative data from a variety of archaeological and ethnographic cases. An attempt is made to place the interpretations into a regional perspective within the Late Formative. (28)

Accola, Richard M. (Texas-Austin) POLYCHROME CERAMICS AND CLASSIFICATION IN GUANACASTE PREHISTORY The polychrome ceramics characteristic of post-A.D. Guanacaste confront the archaeologist with a complex array of decorative motifs. Past attempts at implementing strictly typological classification systems have masked important spatial and temporal differences. It is argued that an analytical (modal) approach using polythetic types best delineates varying distributions. Illustrative examples are drawn from recent analysis of Middle Polychrome Period (A.D. 800-1200) ceramics from the Vidor site, Bay of Culebra. (28)

Ackerman, R. E. (Washington State), T. D. Hamilton (U.S. Geological Survey), and R. Stuckenrath (Smithsonian) EARLY CULTURAL COMPLEXES ON THE NORTHERN NORTHWEST COAST The occupation of the northern sector of the Northwest Coast during the Early Period (circa 10,000-5000 B.P.) is represented by a scattering of sites on the mainland and the offshore islands of the Alexander Archipelago. Definition of the cultural phase(s) is thus far limited to lithic inventories. Information thus far available indicates a considerable amount of contact among groups on the coast and continuing relations with interior groups on the mainland. Characterization of the coastal adaptations during this time period will be based mainly on data from archaeological and geological investigations and from radiocarbon dating of sites in the Icy Strait-Lynn Canal region. (34)

Adovasio, J. M. et al. (Pittsburgh) MEADOWCROFT ROCKSHELTER: RETROSPECT 1978 Meadowcroft Rockshelter is a deeply stratified multicomponent site in Washington County, southwestern Pennsylvania. The eleven well-defined stratigraphic units identified at the site span at least 16,000 and perhaps 19,000 years of intermittent occupation by groups representing all of the major cultural stages/periods now recognized in northeastern North America. Throughout the extant sequence, the site served as a locus for hunting, collecting, and food-processing activities that involved the seasonal exploitation of the immediately adjacent Cross Creek valley and contiguous uplands. Presently, Meadowcroft Rockshelter represents one of the earliest well-dated evidences of man in the New World as well as the longest occupational sequence in the Western Hemisphere. (45)

Adovasio, James M. (see Donahue, Jack) (47)

Albanese, John P. (Smithsonian) GEOLOGIC SETTING AT DUTTON AND SELBY: PRE-CLOVIS SITES IN YUMA COUNTY, COLORADO The Dutton and Selby sites lie 27 km apart, and both occur within closed topographic depressions occupied by playa ponds. The same sedimentary sequence exists at both sites and consists (in ascending order) of the Peorian Loess, a lacustrine silt, a gley soil, and a thick planosol. Both sites contain butchered bone and bone tools made from late Pleistocene animals. These artifacts occur in all units except the planosol. A Clovis level is present at the base of the planosol at Dutton. The pre-Clovis artifact-bearing horizons are estimated to range in age from 12,000 to 17,000 years B.P. (45)

Aldenderfer, Mark S. WHAT MAKES A COMPUTER SIMULATION GOOD? Although simulation is becoming increasingly important in modeling applications in archaeology, little work has been done to specify the conditions under which simulation is valid. Because computer simulations are usually complex and highly technical types of models, they require great care in both development and use. And unlike many other types of models, the success or failure of a computer simulation can be judged by a series of requirements or criteria that can be applied to all simulations. The "formula for success" of simulation models is discussed, and selected aspects of this "formula" are illustrated through a simulation of assemblage formation processes, ABSIM. (20)

Ames, Kenneth M. (Boise State) THE EVOLUTION OF RANK SOCIETIES ON THE NORTHWEST COAST The small, ranked societies on the Northwest Coast evolved autochthonously and without agriculture. Ranked societies are seen as resulting from the interaction of two systems constraints and two processes. The constraints were the ecological and economic specialization in salmon fishing, and environmental circumscription. The two processes were population growth and promotion. Ranking evolves because under certain conditions it provides both improved monitoring of the environment and improved responses to environmental shifts through information flow. (43)

Ammerman, A. J. McDonough, and K. Quilty (SUNY-Binghamton) INTERPRETING NEOLITHIC SETTLEMENT PATTERNS IN THE ACCONIA AREA OF CALABRIA The paper examines the relationships between geomorphology and the visibility of sites identified during work. This is done using the Acconia area of Calabria as a case study. Dense patterns of Neolithic occupation were observed in the area during recent survey work. A comprehensive map of geomorphological exposures (i.e., areas favorable for the observation of surface material) was obtained from the interpretation of color aerial photographs of the area. A comparison is made between this map and that showing the distribution of Neolithic sites from the survey. Preliminary results using techniques in spatial analysis reveal a correlation between the two maps. Implications for the interpretation of settlement systems are briefly discussed. (49)

Anderson, Dana Beth (New Mexico) SOURCES OF PATTERNING IN SPATIAL DISTRIBUTIONS Ethnoarchaeological control data provide information for improving the basis for making judgments as to the sources or identify of factors conditioning spatial patterning. Of particular importance is the consideration of the question in regard to systems specific, versus more general, forms of patterning. (33)

Appel, Jill (Purdue) LITHIC PRODUCTION IN THE VALLEY OF OAXACA (MEXICO) This paper examines change through time in the organization of lithic production in the Valley of Oaxaca as reflected in data from systematic surface survey. The emphasis is on comparing production in the Late Postclassic to that of preceding periods and on discussing the relationship between changes in the organization of production, the organization of exchange, and the organization of the state. (5)

Arundale, Wendy H. (Burke Museum-Washington) QUARTZ, QUARTZ EVERYWHERE AND NOT A "TOOL" IN SIGHT: FUNCTIONAL AND TECHNOLOGICAL ANALYSIS OF CAPE DORSET SURFACE COLLECTIONS Because clearly defined structures and faunal remains are often lacking, archaeologists studying Pre-Dorset and Dorset sites rely heavily on analyses of lithic artifacts. Although most of these analyses concentrate on formed tools, expedient tools and debitage can also provide valuable information. This paper discusses the technological and functional analyses of surface collections from three Cape Dorset area workshop components and contrasts them with findings from four other area sites. The results have important implications for problems related to subsistence and settlement pattern change and for studies using surface survey methods. (44)

Asch, David L. (see Asch, Nancy B.) (15)

Asch, Nancy B. and David L. Asch (Northwestern) ARCHAEOBOTANY OF THE KOSTER SITE: THE EARLY AND MIDDLE ARCHAIC OCCUPATIONS Carbonized plant remains have been recovered from a series of stratified Archaic occupational units at the Koster site, west-central Illinois, dating back to 8700 B.P. Analysis of 14 Early and Middle Archaic units, representing two or more settlement types, discloses a major change in plant utilization at ca. 7500 B.P. Nutshell is poorly represented before this time, but later it is present in quantities indicative of intensive utilization. Annual seed plants are almost completely absent. (15)

Ball, Bruce F. (Simon Fraser) A STUDY OF SURFACE COLLECTIONS FROM ARCHAIC SITES IN WESTERN KENTUCKY Data from surface collections are used to suggest optimal sampling grid sizes for sampling archaeological site surface materials. Several sites in the lower Cumberland River area of Western Kentucky were surface collected during the summer of 1978, point provenience being taken on all materials. The locations of these materials were mapped, and variously sized sampling grids were placed over the site areas for a comparison to be made between sampling units of different size. (29)

Ball, Joseph W. (see Pring, Duncan) (10)

Bankoff, H. A. and F. A. Winter (Brooklyn) A STRATEGY FOR REGIONAL SURVEY IN TEMPERATE ZONE ENVIRONMENTS: THE MORAVA VALLEY PROJECT The paper outlines a cooperative regional survey project involving Brooklyn College and the Beograd Narodni Muzej, involving surface collection from a number of sites in the Morava Valley in Serbia, Yugoslavia. To be discussed are some of the restraints on surface survey characteristic of temperate zone environments and the development of a system that (1) could be used on a variety of sites regardless of size or ground cover, (2) would provide statistically comparable units from each site, (3) could serve as a guide for future surveys and excavations, and (4) would make most efficient use of time and labor. (49)

Barbour, Jamie (Washington State) MICROSCOPIC IDENTIFICATION OF ARTIFACTUAL PLANT MATERIALS FROM WET SITES Excellent preservation of perishable artifacts in wet and frozen sites presents a basic problem of artifactual plant material identification. For artifact analysis the researcher often needs to know which plants (both herbaceous and woody) and often which plant parts were used. At the Hoko River wet site (45CA213) on the Northwest Coast this is being accomplished to better understand: (1) the prehistoric use of the floral environment, (2) replication experiments with hafted stone tools, cordage, basketry, and fishhooks, and (3) problems of conservation. Several microtechniques of identification are discussed including the use of the Scanning Electron Microscope. (37)

Barton, C. Michael (University of Arizona) TERMINAL PLEISTOCENE ENVIRONMENTAL CHANGE AND HUMAN ADAPTATION Significant, broad trends of environmental change at the end of the Wisconsin in North America have emerged from correlation of a series of detailed, regional paleoenvironmental sequences. These trends may be seen in a shift, over most of North America, from a mixed environment of conifer-dominated forest and woodland to a differentiated series of more homogeneous, regional communities. It is suggested that such a shift may have contributed to the decline of Late Pleistocene megafauna and to the appearance of the more diversified, regional human adaptations that characterize the North American "Archaic." Suggestions are made for testing this hypothesis. (29)

Baumler, Mark F. (Arizona) ANALYTIC COMPARABILITY AMONG FLAKE MEASUREMENT TECHNIQUES IN LITHIC ANALYSIS Methods in use for the measurement of flakes in lithic analysis are examined in terms of their analytic potential and comparability. Specifically, the variables of length, width, and thickness are quantified using several different though widely employed systems of measurement. One approach to examining analytic comparability is to compare and contrast trends in flake size over time as represented by each technique. This is done using flake samples from stratified Middle Paleolithic layers at the Mount Carmel cave site of Tabun. Finally, questions are raised regarding what each of these different systems measures in terms of prehistoric lithic technologies. (23)

Bearden, Susan E. (Southern Illinois) FUNCTIONAL AND SPATIAL VARIATION IN BASKETMAKER II SITES ON BLACK MESA Little is known about the Basketmaker II period on Black Mesa, Northeastern Arizona. This paper will investigate site locations and chipped stone assemblages from Basketmaker sites to determine what factors influenced the site placements and how each site functioned within the settlement/subsistence system. Site locational analyses and functional analyses of the chipped stone material collected from the sites will be performed to meet the desired goals. (8)

Baudry, Marilyn P. (UCLA) SHERDS AMONG THE ASHES: THE CERAMICS OF THE ZAPOTITAN BASIN, EL SALVADOR Four sets of ceramic data from the 1978 field season are analyzed to accomplish the following: (a) establish the chronology of occupation within the basin, using data from a stratified random sample; (b) present ceramic types that show similarities and differences from the Chalchuapa sequence; (c) evaluate the inventory of vessels for a single Maya household when it was buried by a volcanic eruption; (d) examine the Late Classic complex excavated under controlled stratigraphic conditions in a comparative framework discussing influences from the Southeastern Maya periphery and from other regions; (e) contrast materials from two survey operations that suggest a later occupation of a prime area near the Rio Sucio. (11)

Bernick, Kathryn (Victoria) LITTLE QUALICUM RIVER WET SITE, VANCOUVER ISLAND, BRITISH COLUMBIA Excavations at the mouth of the Little Qualicum River, at a wet site (DiSc 1) on the east coast of Vancouver, B.C., revealed an early Gulf of Georgia component dating approximately from 1600 to 700 years B.P. Almost half of the artifact assemblage consists of items manufactured from perishable floral materials. Typologically these corroborate the functional classification of the site as a fishing camp. Species identification of the floral cultural material is remarkably consistent with the ethnographic record for the Gulf of Georgia Salish. (37)

Bevan, Bruce (M.A.S.C.A., Pennsylvania) ARCHAEOLOGICAL USES OF GROUND-PENETRATING RADAR A ground-penetrating radar was used during 1978 at Valley Forge National Historical Park, in conjunction with other geophysical instruments, to locate areas of archaeological potential while keeping excavation to a minimum. Refuse pits, lineaments of buried rocks, a cluster of rocks that may have been an oven, and buried plow scars were located. Radar, like other geophysical techniques, is best used as an extrapolating tool for extending the information obtained from small excavation windows. (6)

Bianchi, T. H., A. F. Servello, and J. D. Morgan (Southwestern Louisiana) DEVELOPING A CULTURAL RESOURCE MANAGEMENT PROGRAM FOR CRISIS CONDITIONS Emphasis is placed on the developmental aspects of cultural resource management modeling in areas where little, if any, information is available. This condition is complicated by several significant factors: high subsurface site density, severe surface disturbance due to tracked vehicles, dense ground cover. The Fort Polk Archaeological Survey has developed an integrated multiphased field strategy and multilevel research design. (39)

Bianchi, T. H. (see Servello, A. Frank) (29)

Binford, Lewis R. (New Mexico) SITE STRUCTURE AS A CLUE TO SITE FUNCTION Most previous discussions of site structure, particularly those addressed to the remains of hunter-gatherer adaptations, have considered the degree that one might expect tight spatial associations among items used in single or closely related tasks conducted at a given site. While this problem is of some interest, of greater general interest is the question of what conditions or "causes" the variable spatial arrangement of artifacts and debris in the archaeological record. If we could answer such a question, we could recognize or identify certain past conditions, or perhaps, stated more forcefully, we could identify certain general behavioral conditions and, in turn, site functions. The identification of structural consequences of different behavioral conditions is directly considered. (33)

Black, Kevin D. (Colorado) SETTLEMENT PATTERNS IN THE ZAPOTITAN VALLEY, EL SALVADOR An archaeological survey of 82 km<sup>2</sup> in the Zapotitan Valley in west-central El Salvador has located 54 prehistoric sites. Forty-two sites are of the Late Classic period, with some Late Preclassic and Early Postclassic occupation also apparent. No Early Classic sites are present, indicating that destruction from the third century Ilopango eruption was total. Most sites cluster near permanent water sources on level terrain, especially in the northern and western portions of the valley, while the steep mountains to the south and east and the prehistorically swampy valley floor were nearly uninhabited. (11)

Black, Thomas K., III (Southern Illinois-Carbondale) THE MMD AND POPULATION DISTANCES The Mean Measure of Divergence, a measure of the "biological distance" between pairs of populations, is shown to be sensitive not only to population size but to the length of the trait list used in its computation. The employment of a very large number of traits almost invariably ensures that the MMD will be statistically significant. This relationship between trait number and statistical significance means that the researcher must thoroughly explore the contributions of particular traits to the MMD if he is to justify his results. (38)

Blake, Michael (Michigan) THE RELATIONSHIP BETWEEN HOUSEHOLD MATERIAL CULTURE AND SOCIAL PROCESSES IN A MODERN TZELTAL MAYAN COMMUNITY Ethnoarchaeologically observed household material culture is seen to vary with social, political, economic, religious, and demographic organization within a Mayan Indian community in Highland Chiapas. A model of the relationships between material and nonmaterial aspects of modern Maya culture is presented focusing on the household level of organization. For each of these social processes, a set of material indicators is isolated that is closely correlated with the process. Hypotheses about the relationship between archaeologically observable material variation within a community and the social processes that lead to that variation are tested and explored. (26)

Blake, Susan E. (Simon Fraser) HOUSE MATERIAL TYPE VARIATION IN HIGHLAND CHIAPAS MAYAN COMMUNITIES This study presents the results of an analysis of the relationship between house material types and social organization, environmental adaptation, and acculturation

in 45 present-day Mayan communities in highland Chiapas. The purpose of the study is to examine the cultural and environmental constraints that may influence household material variation, so that we may be in a better position to use archaeological data as an indicator of social organization and environmental adaptation within prehistoric and Colonial Mayan communities. Results of the preliminary analysis show that house materials vary from region to region, reflecting the natural availability of raw materials. Some house and roof styles vary with respect to the ethnic divisions between Tzeltal and Tojolabal Mayan groups. On the intracommunity level, our data show that variation in house materials reflects social and economic differentiation. (26)

Blakeslee, Don (see Rohn, Arthur H.) (50)

Blank-Roper, Laurie (Arizona State) RAW MATERIALS AND CHANGES IN SOCIOCULTURAL COMPLEXITY: PINEDALE, ARIZONA Two seasons of work in the Pinedale, Arizona area indicate that the archaeological remains are representative of a sociocultural system that developed from a state of lesser to greater complexity. Reflecting this change, likely to be observable in the archaeological record are changes in the use of lithic raw materials and the type and sources of materials utilized. Density of raw material types and stages of manufacture are examined through time and with respect to site type to determine the nature of changes in the utilization of raw materials during a period of increasing sociocultural complexity in this area. (27)

Bleed, Peter (Nebraska) and M. Yoshizaki (Japan) THE YAGI PROJECT: AN UNDERTAKING IN CROSS-CULTURAL ARCHAEOLOGY The Yagi Site, a large Early Jomon community site on the Pacific coast of southwestern Hokkaido, is currently being investigated by a team of North American and Japanese archaeologists. The project contributes to the substance of Japanese prehistory by identifying (1) the nature of the social unit reflected by Yagi and similar sites and (2) the subsistence technology upon which they rested. In addition to these results, as a cooperative undertaking the Yagi project affords an opportunity to elucidate and assay the methodological and procedural differences between Japanese and American prehistoric research. (36)

Bonnichsen, Robson (Maine) THE PRE-PROJECTILE POINT TO PROJECTILE POINT TRANSITION An analysis of bone artifacts made from extinct megafaunal remains from the North American sector of the Beringian Refugium has revealed that some technological procedures can be used to work both bone and stone materials. The study of transfer technology patterns inferred from bone remains provides insights into pre-Clovis peoples' lithic production potential. When the technological transfer concept is taken into account and the repertoire of technological concepts available for artifact production is reconstructed, greater continuity can be seen between pre-projectile point and projectile point traditions. (45)

Boone, James (SUNY-Binghamton) ARTIFACT DEPOSITION AND DEMOGRAPHIC CHANGE IN A EUROPEAN COLONIAL SETTLEMENT Changes in social composition through the 90-year occupation of Qsar es-Seghir, a fifteenth- and sixteenth-century Portuguese military colonial settlement in northern Morocco, are explored through the comparison of changes in deposition rates of various artifact classes ascribable to social and demographic categories of sex, occupation, and status. The analysis employs demographic figures derived from skeletal evidence uncovered in the colony's cemetery as well. (32)

Borger, Jeanine M. (Southern Illinois-Carbondale) LITHIC EVIDENCE FOR A PREHISTORIC TRADE ROUTE THROUGH BLACK MESA, ARIZONA The possibility that an extensive trade route was operating in the upper Moenkopi Wash area of Black Mesa will be investigated. This study will examine functional and morphological tool categories and percentages of imported raw materials. Sites on Moenkopi Wash will be compared to those on Coal Mine Wash for variation in lithic inventories that suggest that the Moenkopi was used as a trade route while Coal Mine Wash was not. (8)

Brand, Ross (B.C. Provincial Museum) WET SITE SOIL SECTIONS The archaeology division of the British Columbia Provincial Museum has developed a method of preserving and removing soil sections from wet sites. The method, which can be used in any climatic condition, uses a newly developed type of cold cure epoxy. (37)

Breternitz, David A. and Allen E. Kane (Colorado) THE DOLORES ARCHAEOLOGICAL PROJECT, SOUTHWESTERN COLORADO. The Dolores Project Cultural Mitigation Program contract was awarded by the Bureau of Reclamation to the University of Colorado in June 1978. Field and laboratory work commenced immediately. The project research design is based on five problem domains: (1) ecological adaptations, (2) paleodemography, (3) community activities and social organization, (4) trade and relations with foreign social groups, and (5) culture change. Task specialists for lithics, ceramics, photography, archaeomagnetic and magnetometer studies, as

well as subcontractors for historic studies, data manipulation and retrieval, and moviemaking, are all contributing to the investigation. (8)

Bronitsky, Gordon (Texas-Permian Basin) ECONOMIC CHANGE IN THE RIO GRANDE VALLEY The late prehistoric period of the Rio Grande Valley is one of increasing variability and uncertainty due to population increase and local climatic fluctuation. Trade serves to expand the agricultural niche of local populations by increasing resource diversity. At the same time, reduction in agricultural land bases leads to greater resort to craft specialization, mass production, and banking of crop surpluses in "luxury goods." The model is evaluated in terms of regional data and ability to explain other regional phenomena and account for differential survival of local populations. (21)

Brooks, Alison S. (George Washington) and John E. Yellen (Smithsonian) DETERMINANTS OF SITE PATTERNING AMONG KALAHARI SAN Further studies of land utilization by Kalahari San have shown that distinctive types of sites occur and that differences between them are conditioned primarily by activity differences. However, within these sites or classes of sites, the patterning of remains continues to be determined primarily by social factors such as group size and composition, functional considerations playing a lesser role. In this paper, we discuss different types of sites and factors that govern archaeological visibility, intrasite patterning, and intersite differences for each of them. (33)

Brown, J. A. and R. K. Vierra (Northwestern) KOSTER SITE RESEARCH: AN OVERVIEW This paper reviews the cultural-ecological approach that has directed research of the Koster site, and it evaluates the progress made toward explaining the many changes observed in the archaeological record found in the sequence of Archaic Period components (ca. 8700-4000 B.P.). Our position has been that (1) a shift in subsistence patterns through time, (2) a trend toward greater commitment to permanent facilities, and (3) a trend toward multiseasonal occupation of base camp settlements are the result of the shift in hunter-gatherer strategies in response to the expansion in resource potential of the aquatic and riverine habitats in the Illinois River Valley during the mid-Holocene. The basic model underlying this position will be compared with other models of hunter-gatherer subsistence-settlement change. (15)

Brown, Ken (Houston) ECOLOGY AND SETTLEMENT SYSTEMS IN THE GUATEMALAN HIGHLANDS Two major settlement system types have been identified ethnographically and archaeologically within the Highlands of Guatemala. Vacant center systems are characterized by large centers with only a very small "permanent" resident population. The remainder of the supporting population is scattered throughout the rural hinterland. Nucleated systems are characterized by nucleated settlements that usually include a hierarchy of size and density. Two valley systems within the Highlands of Guatemala have received intensive systematic archaeological/ecological surveys: the Valley of Guatemala and the Quiche Basin. Data from these areas demonstrate the pre-Columbian development of these two settlement systems. The paper attempts to demonstrate that the major set of determining factors in their development was the ecology of the two valley areas, specifically the distribution of basic resources (agricultural land, water, lithic raw materials). (9)

Bruder, J. Simon (Arizona State) PREHISTORIC SETTLEMENT/SUBSISTENCE STRATEGIES IN THE UPLANDS OF CENTRAL ARIZONA The formulation of a settlement/subsistence model applicable to the late prehistoric period in the uplands of Central Arizona is discussed. The project area may be viewed as a specific case of a widespread archaeological situation that appears to reflect similar events in a number of mountainous zones located on the peripheries of the Gila/Salt River Basin during the twelfth through the fifteenth centuries A.D. Specifically, it is proposed that a population shift resulting from stress in adjacent lowlands caused production levels in the mountain zone to increase to greater intensity than that usually associated with wild food collectors. (8)

Brunson, Judy L. (Arizona State) CORRUGATED CERAMICS AS INDICATORS OF INTERACTION SPHERES Analyses of stylistic attributes of corrugated sherds indicates a differential distribution of styles across the Apache-Sitgreaves Forests in northeastern Arizona. The preliminary interpretation of this pattern is that several interaction spheres operated within the area. Results based on Black-on-white ceramic studies are compared with those based on corrugated ceramics and the symmetry, directionality, and duration as well as magnitude of the interaction spheres involved are discussed. (8)

Bryan, Alan (Alberta) A DIRECTED SEARCH FOR "PRE-CLOVIS" MAN Realization that several technologies in addition to Clovis were present in various parts of America by 11,000 B.P. means that the search for immediate technological origins for paleo-Indian complexes in the contemporary Siberian Upper Paleolithic may be nonproductive. Instead, several advanced "Upper



paleolithic-like" technologies evidently developed indigenously in various parts of America. Substitution of a model of indigenous multilineal development for the generally accepted model of migration and/or diffusion to explain the immediate technological antecedents of paleo-Indian complexes would stimulate establishment of a directed search for stratigraphically secure evidence for nonstandardized tool forms and simple manufacturing techniques brought by the earliest American colonists, which formed the basic tool kit from which several more complex and standardized technologies developed in various parts of America. (45)

Bryant, Vaughn M. and Glendon H. Weir (Texas A&M) PREHISTORIC DIETS IN THE AYACUCHO REGION OF PERU: THE COPROLITE EVIDENCE Over 100 coprolites were examined from deposits in Pikimachay and other nearby archaeological sites in the Ayacucho region of Peru covering a time span of more than 7,000 years. Pollen, plant, and animal remains from these coprolites suggest a food economy centered primarily on the gathering of wild plant foods with some hunting of small mammals. Certain economic plant types can be recognized, but coprolite evidence for the widespread use of agricultural plants is lacking. (1)

Budy, Elizabeth and Lonnie Pippin (Social Sciences Center, Nevada) RESEARCH AND DESIGN IN CONTRACT ARCHAEOLOGY: AN EXAMINATION OF TWO SAMPLING DESIGNS Archaeological sampling procedures under conditions of large-scale mitigation projects are necessarily constrained, to one extent or another, by contract requirements; however, these constraints should not preclude systematic research objectives. Two distinct sampling designs, employed on archaeological surveys undertaken by the Social Sciences Center, are critically examined in terms of specific contract restraints and individual research objectives. A design that elicits only descriptive information is contrasted to one that is well suited to problem-oriented research, i.e., the IPP Powerline Survey and the Nevada Test Site Cultural Resource Management Program. (4)

Buehler, Kent J. and Susan C. Vehik (Oklahoma) A PRELIMINARY MODEL RELATING CHANGES IN PREHISTORIC SETTLEMENT-SUBSISTENCE SYSTEMS TO CLIMATIC CHANGES IN NORTH-CENTRAL OKLAHOMA The role of climatic change as a causal agent for culture change has long been an important topic in southern Plains prehistory. North-central Oklahoma, because it spans an ecological transition area, presents a good opportunity to study the interaction of climate and cultural behavior. This paper will be directed toward the construction of a preliminary model relating changes in prehistoric settlement-subsistence systems to data for climatic change in north-central Oklahoma. Although certain changes in settlement-subsistence activities seem to represent an adaptation to environmental change, others do not. (50)

Buikstra, Jane W. (see Gordon, Claire C.) (29)

Burley, David V. (Simon Fraser) SPECIALIZATION AND THE EVOLUTION OF COMPLEX SOCIETY IN THE GULF OF GEORGIA The Coast Salish cultural pattern is viewed as a specialized hunting and gathering adaptation that has evolved out of a more generalized format. It is suggested that the potential for, and incentives behind, the beginnings of this transition would occur first at the western edge of the Fraser Canyon. However, it is also maintained that the full development could not take place until positioned in a coastal setting. Providing an evolutionary model to account for the Salishan pattern, the interface between the Marpole and Locarno Beach culture types (circa 400 B.C.) is taken to be the actual point of transition. Archaeological data provide partial documentation for the proposed developments. (43)

Butzer, Karl W. (Chicago) THE SCOPE OF GEOARCHAEOLOGY Geoarchaeology represents archaeological research using earth science techniques. It is not a body of techniques but a matter of geoscience (geography, pedology, geology) methodologies that contribute both empirical information and conceptual approaches to understanding the multiscale setting and environmental dynamics of prehistoric groups, i.e., context. Geoarchaeologists must be able to evaluate diverse data and then apply them toward multidisciplinary modeling of subsistence-settlement systems. A more effective contextual paradigm of archaeology, in which geoarchaeology would serve as a central approach, must evolve from within the discipline. (47)

Byland, Bruce E. (Penn State) A LOCATIONAL APPROACH TO CULTURAL EVOLUTION IN THE MIXTECA ALTA REGION OF OAXACA, MEXICO Diachronic locational analyses of cultural and environmental data derived from a recent archaeological survey conducted in the Tamazulapan valley in the Mixteca Alta are used to generate a new model of the evolution of sociopolitical and economic complexity in the Mixteca Alta between 1300 B.C. and A.D. 1520. The evolution of ranking and stratification in the area is viewed as a product of both internal development and external contact. A history of alternating periods of relative isolation and extraregional integration gave rise ultimately to the complex array of semiautonomous *cacicazgos* encountered by the Spanish at the time of the conquest. (9)

Byrd, Brian F. (Arizona) SURFACE AND SUBSURFACE ARTIFACT VARIABILITY An understanding of the relationship between surface and subsurface artifact variability in terms of size, horizontal distribution, frequency, and classes of artifacts represented requires identification of both the natural and cultural formation processes operating upon a site and the magnitudes of the effects of such processes. Without this knowledge, behavioral inferences derived from surface artifact assemblages are suspect. The size effect model (House and Schiffer 1975; Baker 1978) attempts to explain one aspect of site variability. Additional insights on this problem are presented, based on data obtained from Az P:14:176, a single-component site excavated by the University of Arizona in 1978. (38)

Cable, John S. and Rachel Most (Arizona State) THE BIPOLAR TECHNIQUE: ERROR OR ADAPTATION? When first recognized in the archaeological record of North America by Binford and Quimby (1963) at several Late Woodland sites in Michigan, the bipolar technique was considered something of a novelty. With time, however, the geographical distribution and temporal context of the phenomenon have been significantly expanded. A strong case can be made that the bipolar technique as an observational phenomenon has existed in the archaeological record since at least the Pleistocene-Holocene transition and probably on a continent or worldwide scale. (42)

Campbell, Sarah (Washington) LATE PREHISTORIC STURGEON PROCUREMENT ON THE LOWER COLUMBIA RIVER: THE EVIDENCE FROM HAMILTON ISLAND, SKAMANIA COUNTY, WASHINGTON Archaeological investigations in Skamania County, Washington, provide evidence that sturgeon fishing was a stable and important prehistoric subsistence activity. Occupational debris recovered from Hamilton Island spanning the fourteenth to seventeenth centuries is characterized by abundant weights and sturgeon bone. Intercomponent analysis indicates no significant functional change through time, while functional contrasts with other sites establish that this locale is a distinct seasonal station. Cessation of sturgeon fishing on Hamilton Island before contact may indicate a general shift in resource use and account for the discrepancy between the ethnographic and archaeological records on the importance of sturgeon procurement. (3)

Carlisle, R. C. (see Adovasio, J. M.) (45)

Carlson, Catherine EARLY NON-SHELL COMPONENTS FROM PORT HARDY, BRITISH COLUMBIA The content and meaning of lithic assemblages from two nonshell strata underlying a classic shell midden site on the northern end of Vancouver Island (Hardy Bay) are described and explored. The earliest of the nonshell zones is associated with a raised beach deposit and consists of a prepared flake industry with leaf-shaped points. The younger nonshell zone underlies the shell deposit on the lower terrace of the site and is associated with present-day sea levels. This zone contains evidence of both chipped stone and bone industries. Also present are fish, land mammal, sea mammal, and bird remains. The relationship of these components to others of the same period is explored. (34)

Carlson, David L. (Illinois State) MOBILITY STRATEGIES AND SITE STRUCTURE AT KOSTER A model for hunter-gatherer mobility strategies is developed in terms of the environmental and demographic processes determining differences in mobility. The implications of the model for site structure are discussed in order to relate shifts in mobility to shifts in the organization of space within the site. The distribution of various categories of debris for 12 components at Koster (Horizons 8 through 10) is then examined for the presence of the postulated distinctions in site organization. Principal components analysis is utilized to isolate patterns in debris by-products. The presence of a base camp in Horizon 8C (7000 B.P.) is discussed in terms of its implications for the Midwestern Archaic. (15)

Carlson, Roy L. THE EARLY PERIOD ON THE CENTRAL COAST OF BRITISH COLUMBIA Unlike all other periods of Central Coast prehistory, the Early Period is typified by a high frequency of flaked stone tools. These assemblages include tools of diverse types: pebble tools, leaf-shaped bifaces, microblades, macroblades, and prepared (Levallois-like) flakes and cores. This paper explores the question of both the external affinities of these industries and their relationship to the way of life during the period. (34)

Casteel, Richard W. (Simon Fraser) ETHNOARCHAEOLOGY AND A TEST OF SOME BASIC ZOOARCHAEOLOGICAL PRECEPTS Ethnoarchaeological data are used to test the accuracy of predictions made from zooarchaeological devices. The results indicate that taxonomic lists from archaeological faunas are equal to or better than those from ethnographic sources. In addition, biases in rates of identification and recovery of faunal remains may be discovered and adjusted for. Ordinal abundance of taxa from archaeological faunas is generally positively correlated with ethnoarchaeological data. Behavior of various MNI indices is also examined, and the results indicate rejection of both Ducos' (1975) and Gromova's (1948) theses. (25)

Chandler, Susan M. (Centuries Research) EXCAVATIONS AT THE CAMBIO SITE Test excavations at the Cambio site in west-central El Salvador revealed the existence of a complex stratigraphic sequence of three distinct prehistoric occupations "sandwiched" between ash deposits from four volcanic eruptions. Data recovered from the excavations have provided insights into diachronic culture change at Cambio and have aided in the interpretation of sites recorded during the Zapotitan Valley survey. Soils analyses have provided valuable data on the changing agricultural potential of prehistoric soils; these data are of special importance to the understanding of human recovery from the impacts of volcanic eruptions in the Zapotitan Valley. (11)

Chandler, Susan M. (see Reed, Alan D.) (8)

Chartkoff, Joseph L. and Kerry K. Chartkoff (Michigan State) ARCHAEOLOGY IN CATHEDRA: THE GO ROAD PROJECT. Literature on archaeological methods does not discuss how to do research on lands considered traditionally sacred by present-day cultures. Yet the preservation of those lands and appropriate cultural resource management mean that research is needed to gather data allowing protection and planning. The GO Road Project, conducted by Theodoratus Cultural Research and Michigan State University in mountains sacred to the Yurok of Northwest California, combines ethnographic and archaeological research, total avoidance of excavation, nonremoval of artifacts from sensitive sites, on-site Native American observation, and intensive surface sampling to help resolve conflicting values. (39)

Chartkoff, Kerry K. (see Chartkoff, Joseph L.) (39)

Chase, Philip G. (Arizona) and Harold L. Dibble (Arizona) TEMPORAL CHANGES IN SHAPES OF FLAKES FROM TABUN, ISRAEL Recent studies have shown changes in morphology of unretouched flakes through time in the Levantine Mousterian. A new method of measuring artifact shape permits another method for statistically testing and enlarging upon these results. (23)

Chavez, Mark C. (see Gibson, Eric L.) (3)

Chomko, Steven A. (Bureau of Land Management) LATE PLEISTOCENE ENVIRONMENTS AND MAN IN THE WESTERN BIG HORN MOUNTAINS, WYOMING Prospects Shelter and Natural Trap Cave contain a record of faunal successions from before 26,000 to 10,000 B.P. The data indicate that until 13,500 B.P. a steppe-boreal forest community was present; at 13,500 B.P., a change to a steppe tundra is indicated by the presence of *Dicrostonyx* and a marked decrease in large herbivores. Evidence for utilization of the shelter, dated at 16,272 and 17,500 B.P., is based on a chert artifact, flakes, and a pierced *Camelops* phalanx. Additional extinct fauna associated with this assemblage includes *Equus* sp. and *Ovis c.f. catclawensis*. (45)

Choyke, Alice M. (SUNY-Binghamton) ANALYSIS OF BONE/ANTLER TOOLS IN A METAL USING SOCIETY Little work has been done on the role of bone/antler tool industries in metal-using prehistoric society. Bone and antler are not such amorphous raw materials as either stone or metal. The study presented here attempts to work out the numerous classification problems associated with a tool category where the tool function and form is so closely linked to the original bone type. From there the study goes on to a consideration of the role of bone/antler tools in the Bronze age. The previously unanalyzed material comes from Pákozdvár, a major hill-fortress occupied during the middle Bronze age in Hungary. (23)

Ciolek-Torrello, Richard (Arizona) LATE MOGOLLON SETTLEMENT IN CENTRAL ARIZONA The thirteenth-century occupation of the mountain region south of the Mogollon Rim and north of the Salt River was characterized by a dense population and complex settlement system best known for its large pueblos and numerous cliff sites. Recent surveys completed by the Arizona State Museum in two small basins in this region provide essential information about other aspects of the system. Comparison of these data with that of other surveys in the region makes possible a trial reconstruction of the regional settlement system. The development of this system and its implications for regional subsistence and exchange are discussed. (8)

Clark, Geoffrey A. (see Straus, Lawrence G.) (23)

Cleere, Henry F. (Council for British Archaeology) ARCHAEOLOGY AND LAND-USE PLANNING IN BRITAIN Although the U.K. lacks legislation comparable with NEPA or Moss-Bennet, British archaeologists have advanced further than their U.S. colleagues in one important aspect of cultural resource management. An archaeological input is now regularly taken into account in most planning decisions. Planning law in the U.K. is comprehensive: as a result of successive legislation since 1947, official approval is required for almost any action that involves the land-

scape. There is an elaborate structure of planning authorities, from central government downwards, and provision is made for public consultation at most stages. Long-term strategies and shorter-term plans are constructed by these authorities, and archaeological constraints are increasingly being incorporated into these plans. (39)

Clymer, Mark (Archaeological Consultants) and Eugene Sterud (Archaeological Institute of America) APPLICATIONS OF ELECTRONIC SURVEYING, MAPPING AND DATA-RECORDING EQUIPMENT TO STUDIES OF SPATIAL PHENOMENA Recently perfected electronic instruments, infrared and microwave transits, data collector, minicomputer, and electronic pen-plotter, have been successfully applied to a variety of archaeological and geomorphological field situations. Applications to be discussed include: (a) topographic mapping and pen-plotted contour maps; (b) microwave plotting of intersite data; (c) layout and gridding of intrasite areas for studies of internal space utilization; (d) generation and processing of surface data and presentation of density contours; (e) point-provenience plotting; and (f) topographic profiles of land forms. (47)

Conklin, Barbara M. (American Museum of Natural History) NEW STORAGE AT THE AMERICAN MUSEUM OF NATURAL HISTORY—BALANCING CHANGE AND CONTINUITY The necessity for changes in artifact storage systems can be a result of new policy directions or new environmental standards, as well as simple artifact accretion. The AMNH, with approximately 5 million specimens, is exploring new solutions as it develops a major new storage program to be contained within the existing museum structure. A new Textile Storage and Research Laboratory is now in use, as is new storage for North American Archaeology. An additional major storage area is being created by reorganizing use of existing space. To free the space for remodeling and construction, several transitional storage solutions are being planned and carried out sequentially. Careful control of specimens is maintained to ensure security and retrievability. (31)

Cook, Thomas Genn (Indiana) KOSTER SITE: MIDDLE ARCHAIC CURATORIAL BEHAVIOR A model for prehistoric curatorial behavior is tested using fabricated, incremental, and incidental tools recovered from five Archaic occupations at the Koster site. In general, fabricated tools (hafted forms) are recovered in broken or worn-out condition while usable ones were systematically removed (curated) in prehistory. Incremental tools (manos) are left behind for potential future use (cached). Incidental tools (utilized flakes) are simply discarded. Implications for assemblage analysis are discussed: the recovered tool assemblage imperfectly reflects the spectrum of activities performed on a prehistoric living floor. (15)

Cordell, Linda S. (New Mexico) DETERMINISTIC VS. STOCHASTIC SIMULATION OF ANASAZI HABITATION SITE LOCATION AND LAND USE Simplified flow diagrams illustrate two kinds of simulation models designed to predict changes in the location of Anasazi residential sites and the amount of land needed to support them. The simulations model survey data from Mesa Verde, Colorado. Examples of generated output suggest that simple deterministic models are frequently more productive for archaeological questions unless investigators are explicitly concerned with the long-term effects of variables that are known to behave in a stochastic manner or when generated data are to be used for testing specific techniques of statistical analysis. (20)

Cowan, C. Wesley and Richard I. Ford (Michigan) EARLY AGRICULTURE: EVIDENCE FROM CLOUDSPITTER ROCK SHELTER, KENTUCKY Cloudspitter Rock Shelter, located in the Red River Gorge in eastern Kentucky, has yielded a sequence of normally perishable plant and animal data resulting from sporadic seasonal occupations beginning ca. 8000 B.C. to A.D. 1200. A long Archaic sequence produced two varieties of squash (*Cucurbita pepo* and *C. pepo* var. *ovifera*) and bottle gourd (*Lagenaria siceraria*), perhaps antecedent in this complex stratigraphic deposit to the native cultigens swampweed (*Iva annua* var. *macrocarpa*), sunflower (*Helianthus annuus*), goosefoot (*Chenopodium bushianum*), and maygrass (*Phalaris caroliniana*). Theoretical issues and practical considerations of preceramic hunting, gathering, and gardening in the evolving Mixed Mesophytic forest will be discussed. (29)

Cowgill, George L. (Brandeis) POLITICO-ECONOMIC FACTORS IN THE DISINTEGRATION OF EARLY STATES Politicoeconomic factors are commonly mentioned among causes for disintegration of early states but sometimes given insufficient attention. There may be a one-sided emphasis on environmental disasters as prime causes of sociopolitical disasters, as in recent discussions of the collapse of Old Kingdom Egypt. However, Chinese history illustrates politico-economic processes that lead to political disaster even without environmental disasters. These processes were probably also present in Old Kingdom Egypt, and they may have been at least as important as environmental events in bringing about the collapse. The methodological implications are relevant for all early civilizations. (46)

Cox, Steven L. (Smithsonian) **THE LARGE AND THE SMALL—A VIEW OF DORSET ECONOMY** In 1966 W. E. Taylor characterized Eskimo economy in general, including Dorset, as being fundamentally omnivorous and flexible. The degree of flexibility of Dorset economic adaptations has important implications in relation to current models of Dorset population expansion and extinction, as well as to questions concerning the replacement of Dorset by Thule in the eastern Arctic. In this paper various aspects of the Dorset economic system, including resource utilization, settlement pattern, and extractive technology, are examined with particular reference to the degree of variability and flexibility present within the system. Data from northern Labrador and Southampton Island constitute the primary basis of the analysis, although other areas will also be considered. (35)

Crawford, Gary W. (North Carolina) **THE PALEOETHNOBOTANY OF COASTAL OSHIMA PENINSULA, HOKKAIDO** Plant remains from four Jomon sites representing seven archaeological components spanning 5,000 years in the coastal Oshima Peninsula are reported. The large quantity and variety of plant remains recovered by flotation reflect human-environmental interactions that help explain the successful Jomon adaptation in southwestern Hokkaido. Hypotheses regarding site disruption, increased sedentism, plant husbandry, and Hokkaido Jomon subsistence patterns are examined from a diachronic perspective. Early through Middle Jomon subsistence ecologies are quite similar and contrast with the subsistence ecology of the Initial Jomon. Herbaceous weeds, riverine plants, and forest-edge plants were most important for food from about 4000 B.C. on. (36)

Creamer, Winifred (Tulane) **REPORT ON PRELIMINARY SURVEY IN THE UPALA AREA (ALAJUELA) COSTA RICA** A short survey sponsored by the Museo Nacional of Costa Rica conducted by the author in July 1978 is reported. The area surveyed is little known and is located in north-central Costa Rica on the coastal plain south of Lake Nicaragua and north of the Guanacaste mountains. Preliminary analysis of the materials collected through quadrant sampling procedures indicates that a substantial population was present in this area during pre-Hispanic times. Most of the locations sampled appear to date later than A.D. 300. (28)

Croes, Dale R. (Washington State) **OZETTE VILLAGE AND HOKO RIVER WET SITES: 3,000 YEARS OF NORTHWEST COAST PREHISTORY** Two Northwest Coast wet sites, representing approximately 3,000 years of Washington Coast prehistory, are being jointly investigated. The Ozette site is a complete section of a Northwest Coast village, including numerous plank houses, that was covered and preserved by a massive clay mudslide approximately 500 years B.P. The nearby Hoko River site is a "seasonal" fishing station where numerous layers of offshore deposits contain preserved perishable artifacts. The site represents a time span from approximately 3000 to 1000 years B.P. Comparative analyses of both sites demonstrate considerable temporal continuity for major Northwest Coast hunting and fishing procurement techniques as well as woodworking and basketry technologies. (37)

Cross, John R. (Massachusetts) **SEASONALITY OF SHELLFISH UTILIZATION IN BOSTON HARBOR** Shellfish represent a predictable, year-round food resource for hunter-gatherers. There are reasons to expect only seasonal use of these resources: the need for a dependable food source before the anadromous fish runs in the early spring; heat efficiency of protein metabolism in winter; and avoidance of paralytic shellfish poisoning in summer. Interpretations of daily growth lines in shells of *Venus mercenaria* and *Mya arenaria* recovered from Boston Harbor middens provide the framework for determining the seasonality of shellfish utilization and for understanding the nature of shell midden accumulation. (24)

Daugherty, R. D. (see Gustafson, Carl E.) (34)

Davis, Anthony M. (Toronto) **POLLEN ANALYSES FROM HOKKAIDO JOMON SITES** Pollen from the Hamanasuno and Yagi sites has low concentration and small variety. The limited recoveries, partly caused by high soil pH (6.5), are largely attributable to the lack of a palynological perspective in the selection of materials for analysis. However, some useful conclusions regarding regional and local vegetation can be made. A mixed conifer-hardwood regional vegetation is suggested. Local pollen assemblages imply open sites dominated by weeds and shrubs. No cultigen pollen was identified. The paper considers the problems of collection and processing, discusses the results of the preliminary analyses, and suggests strategies for future research. (36)

Davis, Hester (Arkansas Archeological Survey) **THE PROBLEMS AND ETHICS OF BUDGETS AND COST ACCOUNTING** Visions of unlimited funds for archaeology have sometimes gone to the archaeologist's head. Lack of experience in real world budgeting has caused people to estimate budget proposals unrealistically; items may be included in budgets that are neither appropriate nor legal. Rising competition in contracting sometimes means unrealistically low budgets are presented in order to ensure getting the contract. Being accountable for what is spent is also a

new world to archaeology. Many of these practices are damaging the credibility of archaeology and sometimes damaging the resources. Many of them are illegal, or unethical, or both. (17)

Deal, Michael (Simon Fraser) **RITUAL-USE POTTERY IN AN ONGOING CULTURAL SYSTEM** Ethnoarchaeological data from the Central Chiapas Highlands show that the Mayan family altar provides a useful context for distinguishing ritual-use pottery in archaeological households. It is also possible archaeologically to distinguish ritual-specific types other than the incense burner. These include locally made plainwares such as specialized colanders, large fiesta cooking pots, and candle-making cups, which are associated with high cargo positions. Other criteria, such as degree of curatión, type frequencies, and reuse and industrial replacement behaviors, are also useful for recognizing ritual pottery types. (26)

De Atley, Suzanne P. (UCLA) **ORGANIZATIONAL REQUIREMENTS FOR SPECIALIZED CERAMIC PRODUCTION IN THE SOUTHWEST: A PRELIMINARY VIEW** While different forms of ceramic production have been documented for the Southwest, the conditions that lead to these differences remain obscure. To address this problem, characteristics of group organization that supported specialized manufacture in the Southwest are studied through a comparative analysis of ceramic production in several different regions. The resultant patterns are discussed, and inferences for the general study of the development of craft specialization are considered. The analysis is evaluated in terms of the limitations of data and methods, and suggestions are made for future work. (14)

Debenath, André (see Schwarcz, Henry P.) (7)

Dekin, Albert A., Jr. (SUNY-Binghamton) **PREDATORY ARCHAEOLOGY: TERRITORIALITY AND THE RESOURCE BASE** A predation model of contract archaeology is appropriate for two reasons. First, contract archaeologists are consumers of the cultural resource base. Second, they tend to establish research domains or territories. These factors lead to ethical judgments in matters of consumption and of territorial defense and encroachment. With active responsibility for cultural resources shifting from local archaeologists to federal managers, ethical conflicts increase, and ethical judgments become more complex, reflecting the competing interests of individuals and institutions involved with cultural resource management. The present ethical chaos will continue until explicit and measurable standards for the process and product of archaeological research are adopted. (17)

Del Bene, Terry A. (Connecticut) **HANDEDNESS AND BURIN MANUFACTURE: AN EXPERIMENTAL STUDY** It has been suggested that an examination of the orientations of burin spall removals can be employed to determine the overall handedness proportions of an aboriginal population. In order to test this assumption, populations of modern flintworkers were sampled, and the results compared with archaeological samples. Results indicate that modern flintworkers tend not to reveal any indication of population handedness. However, a number of archaeological samples suggest that there may have been more of a tendency for orienting flakes in a certain manner during spall removal. Whether this indicates population handedness or not requires further study, since a number of other factors may affect flake orientation during spall removal. (42)

Deniro, Michael J. and Samuel Epstein (Caltech) **ANALYSIS OF THE USE OF MAIZE AS A DIETARY CONSTITUENT FROM THE <sup>13</sup>C/<sup>12</sup>C RATIOS OF COLLAGEN IN FOSSIL HUMAN BONE: TEHUACAN VALLEY, MEXICO AND VIRU VALLEY, PERU** Variations of <sup>13</sup>C/<sup>12</sup>C ratios of collagen in human bones from the Tehuacan Valley and the Viru Valley are interpreted in terms of changes in the dietary utilization of maize. In Tehuacan, the data suggest that maize was introduced and became an important food source between the El Riego and Coxcatlan phases and that its contribution to the diet remained constant from the Coxcatlan through the Venta Salada phases. In the Viru Valley, there is isotopic evidence for the introduction of maize by the Mayago period and for its heavy utilization as a food source from the Puerto Moorin through the Moche periods. (1)

Dent, Richard J. (National Colonial Farm) **ECOLOGICAL ANTHROPOLOGY AND THE AGGRESSIVE FIELD LABORATORY** This paper specifically addresses an aspect of the aggressive field lab: the task of preserving ecological information, which is increasingly being extracted from archaeological sites. Quite clearly, it is also making a statement about responsibility to produce competent scientists for the collection of these data as well as the need for basic ecological data sets, which must be collected from every archaeological site because of the nonrenewable nature of the discipline's information base. Collection of ecological data in conjunction with the Upper Delaware Valley Early Man Project is employed to illustrate this manifesto. (30)

Dibble, Harold L. (Arizona) **DEVELOPING MOTOR PATTERNS OF UPPER PLEISTOCENE HOMINIDS: EVIDENCE FROM THE ANALYSIS OF LITHIC MATERIALS FROM TABUN CAVE (ISRAEL)** Differential motor capabilities represent one potential factor contributing to lithic

variability. Recent controlled experiments in lithic technology make it possible to begin to understand the relationship between stone artifacts and the motor patterns of those who made them. On the basis of these results, this paper examines Upper Acheulian and Mousterian materials recovered from the Tabun Cave and demonstrates how certain aspects of the variability existing among these assemblages can be placed into the context of developing motor capabilities of the hominids in that area. (23)

Dibble, Harold L. (see Chase, Philip G.) (23)

Dibble, Harold L. (see Whittaker, John C.) (42)

Dickson, D. Bruce (Texas A&M) ANCIENT AGRICULTURE AND POPULATION AT TIKAL, GUATEMALA: AN APPLICATION OF LINEAR PROGRAMMING TO THE SIMULATION OF AN ARCHAEOLOGICAL PROBLEM Estimates of the size of the population during the Late Classic period at the Lowland Maya site of Tikal, Guatemala are reviewed. Linear programming is suggested as a method for simulating the agricultural carrying capacity of the site and inferring the center's potential population. The results of 20 computer runs with linear programs, calculating the maximum population supportable by different combinations of *milpa*, intensive farming, and arboriculture, are discussed. Results tentatively suggest a mixed subsistence strategy, that combined ramon seed arboriculture and intensive root cropping supplemented by kitchen gardening, hunting, gathering and trade might have supported a population as high as 70,551 people within the Tikal sustaining area during the Late Classic period. (20)

Diehl, Richard A. (Missouri-Columbia) MEXICAN GULF COAST SETTLEMENT PATTERNS: PROBLEMS AND SOLUTIONS Settlement pattern studies of Formative Mexican Gulf Coast societies encounter problems that make it more difficult to reconstruct sociopolitical organization from settlement data than is the case in the Mexican highlands. These problems are illustrated by the Rio Chiquito, Veracruz, survey of Formative and modern communities. They include incomplete survey, absence of surface remains, site invisibility and alteration, and inadequate chronological control. Alternative interpretations of the same data sets illustrate the potential range of confusion. Solutions include judicious use of contemporary settlement pattern and landscape formation data, remote sensing, monitoring construction activities, maintenance of close contact with local residents, and systematic use of test pits for chronological control. (9)

Dirst, Victoria (Wisconsin-Oshkosh) FAUNAL REMAINS FROM SAUER RESORT The Sauer Resort site in east-central Wisconsin has yielded a large quantity of faunal remains. Preliminary analysis of this collection substantiates the belief that the Lake Winnebago phase of the Oneota made seasonally intensive use of fauna dwelling in and near the marshes and lakes of this region. Economic pursuits suggested by the faunal remains include the spearing of large fish; the hunting of birds, beaver, raccoons, deer, and elk; the procuring of turtles and frogs; and the use of scapula hoes and other bone tools probably manufactured during the winter at a separate camp. (29)

Dobyns, Susan (Arizona) IDENTIFYING ETHNICITY IN THE ARCHAEOLOGICAL RECORD Several of the social sciences have addressed the issue of ethnicity, but rarely has this problem been explored archaeologically. This paper provides a "state of the art" analysis of ethnicity and archaeology through (1) a critical review of social science understanding of ethnicity, particularly the relationship and utility of extant data for archaeological identification and explanation of ethnicity and (2) an examination of potentials for ethnicity-archaeology research. (12)

Dolphin, Lambert (SRI International) GEOPHYSICAL PROSPECTING IN ARCHAEOLOGY A joint team from SRI International and the Egyptian Organization of Antiquities has been working together since 1974 to apply both newly developed and traditional geophysical techniques in Egypt. During three sessions' fieldwork at Giza, Saqqara, and Luxor, the team has employed ground-penetrating radar, acoustic sounding, resistivity, and magnetometry for several unusual exploration tasks. The value of such methods is that they can guide the archaeologist and improve his efficiency in subsequent excavations. Acoustic sounding appears to be useful in studying the interior of structures such as the Pyramids or locating missing tombs in the Valley of the Kings. (47)

Donaghey, Sara (see Hammond, Norman) (10)

Donahue, Jack and James M. Adovasio (Pittsburgh) GEOLOGICAL INVESTIGATIONS AT MEADOWCROFT ROCKSHELTER. Geology provides a useful physical framework to aid in interpreting archaeological sites. At Meadowcroft Rockshelter, three sources, rock fall, attrition, and sheet wash, contribute sediments to the colluvial pile that contains cultural material. Spatial and

temporal changes in amount of sediment from the three sources reflect both climatic and living floor topographic change. Placement of rock fall episodes and thickness changes of the 11 natural strata on the excavation grid allows reconstruction of paleotopography for successive living floors. (47)

Donahue, Randolph E. (Michigan State) LAND-USE OF THE "HIGH COUNTRY" IN NORTHWEST CALIFORNIA The "High Country" has long been considered a sacred area by the Northwest California Indians. An archaeological survey was recently completed to determine the extent of religious, economic, and social activities that had occurred there in the past. Using ethnographic data, six hypotheses were proposed as to the use of the study area. These include its use for religious activities, the exploitation of salmon, acorns, and large game animals, as a refuge from epidemics in the lowlands, and for intertribal councils. Preliminary results indicate that this area was used to a much greater extent than previously suspected. (32)

Doyel, David E. (Arizona State Museum) PUEBLO II PERIOD SETTLEMENT AND SUBSISTENCE IN THE UPPER LITTLE COLORADO REGION, EAST-CENTRAL ARIZONA A high density of Pueblo II period (A.D. 900-1150) settlements was discovered to exist in waterless areas located some distance from the major drainages in the vicinity of Springerville, Arizona. Locational, technological, palynological, and botanical data recovered through excavation and survey are employed to demonstrate that settlements were located in the area to take advantage of extensive sand dunes, which were used for farming. Speculation is presented about why these dune fields were utilized only during the Pueblo II period when much greater time depth occurs in nearby areas. Implications for regional settlement system models are discussed. (48)

Drucker, Philip (Baylor) A TECHNO-ECOLOGICAL MODEL OF NORTHWEST COAST RESOURCE EXPLOITATION This model analyzes the interaction of three distinctive Northwest Coast technological subsets: subsistants, water transport, and large structures, through which raw resources were converted to winter stores. It is hypothesized that co-occurrence of all three subsets was essential to the food-storage procedure that made possible multigroup winter villages, winter ceremonials, etc., the distinctive features of "classic" Northwest Coast culture of ethnohistoric/ethnographic accounts. An ethnographic case, a Niska account of Ts'ets'at salmon fishery, and two historic events, impact of destruction of two (Tlingit) Kuiu and Hutsnuwu villages, support the hypothesis. Archaeologic relevance of the model and its derived hypothesis is demonstrated in the conclusion. (43)

Dykman, James L. (Utah) UTILIZATION OF NATIONAL REGISTER CRITERIA AND STATUS IN RESEARCH DESIGNS FOR CULTURAL RESOURCE PROJECTS The National Register of Historic Places is a program of the Office of Archeology and Historic Preservation within the Heritage Conservation and Recreation Service. It is part of a national policy to coordinate and support public and private efforts to identify, evaluate, and protect our cultural and natural resources. This program is also intended to provide information about archaeological sites and districts. The information available and legal status of the sites should be used to develop research designs for all types of cultural resource projects. How the national register status should be used is discussed in this paper. (4)

Dyson, Stephen L. (Wesleyan) PROBLEMS AND POSSIBILITIES IN THE RECONSTRUCTION OF ROMANO-ITALIAN SETTLEMENT HISTORY Roman history presents a good example of a society whose imperfectly preserved literary record has tended to distort and downgrade the use of archaeology as an independent social science tool. Only in the last 25 years have archaeologically oriented settlement studies been undertaken by British, Canadian, and American groups. These have forced a serious reevaluation of the history of Roman agriculture. They have also shown the extent of regional variation and raised numerous methodological problems. There is a need for a coordinated approach to Roman-Italian settlement history and archaeology. (49)

Earle, Timothy (UCLA) THE CENTRALIZED ECONOMIES OF STRATIFIED SOCIETIES This paper examines the evolution of the centralized economic systems characteristic of chiefdoms and archaic states. It will be shown that these centralized economies function both to maximize the mobilization of resources to the political superstructure and to minimize fluctuations in subsistence resources available to the local dependent populations. Specific cases discussed include the Inca empire state and the advanced Hawaiian chiefdoms. Differences in the structure and capacity of the economic systems are outlined. (21)

Early, Ann M., Daniel Wolfman, H. J. Fulbright, and Charles Stone (Arkansas) TRACE ELEMENT ANALYSIS OF TURQUOISE ARTIFACTS AND RAW MATERIALS FROM SOUTHWEST ARKANSAS Turquoise beads have been recovered from six Mississippi period sites of the Caddo cultural tradition in the trans-Mississippi South. One hypothesis, with some archaeological and docu-

mentary support, concerning the source of the beads suggests a Southwestern origin. An alternative hypothesis based upon geological evidence is also proposed. Trace elements analysis using X-ray fluorescence was performed on the beads and on raw turquoise collected from three Arkansas locations. Results of the analysis were compared with data from Southwestern turquoise sources. Preliminary results suggest the beads may have been made from turquoise of local origin. (32)

Effland, Richard W. (see Jones, A. Trinkle) (41)

Embree, Lester (Duchesne) **THE NEW ARCHAEOLOGY AND THE NEW PHILOSOPHY OF SCIENCE** In contrast to the long-dominant logical empiricism, a new tendency in philosophy of science emphasizes the history and sociology of scientific communities in the attempt to understand how science is actually done. By virtue of its recency and size, the so-called new archaeology is perfect for such an approach: its literature can be mastered by one person, and virtually all of its advocates are still alive and thus able to provide oral history. This paper is being presented partly in order to assess the mood of the archaeological community to be investigated in this way. The new philosophy of science and some of its results will be sketched, and then the problems and approaches for a case study of the new archaeology will be presented, in the hope for lively discussion. (19)

Emerson, Thomas E. and Patrick S. Willey (South Dakota) **WARFARE AMONG 15TH CENTURY AGRICULTURALISTS IN THE MISSOURI RIVER VALLEY OF SOUTH DAKOTA** Recent salvage excavations by the authors in the fortification ditch of the Initial Coalescent site of Crow Creek (39BF11) revealed the remains of from 200 to 300 men, women, and children. The bodies, which had been thrown into the ditch, were partially disarticulated, many showing signs of scalping and mutilation. With the new evidence available, it can be observed that warfare here in the A.D. 1400s was on a large scale between peoples of different ethnic affiliations, included ritual mutilation, and may have developed out of competition for limited resources. (32)

Epstein, Jeremiah F. (Texas) **CONJURING UP THE FUTURE** Lithic studies today include efforts to identify individual knappers and their flake reduction techniques, the way tools were used and on what, the methods of heat treatment, and the sources of stone. In this paper we shall assume that all of the work being done today is successful. Where do we go from here? What kinds of questions can now be asked? In this paper we try to anticipate what archaeological research will be like in the twenty-first century—after the lithic technologist has done his "thing." (42)

Epstein, Samuel (see Deniro, Michael J.) (1)

Ericson, Jonathon E. (Harvard) **CALIFORNIA OBSIDIAN HYDRATION RATES** 14 hydration rates of California obsidian are presented. The results indicate that defining the source leads to a refinement of the hydration rate. Although a set of chemical and physical factors that influence the change in rates has been determined, it is not expected that this line of research will be particularly fruitful in defining worldwide hydration rates. The results of these studies indicate that the hydration process does not fit a linear or experimental model; i.e., hydration is complex. It is suggested that future research should concentrate on environmental variables. (7)

Evans, June (American) **THE SITE-SPECIFIC LAB AND FIELD MANUAL: A GUIDE FOR THE PERPLEXED** A site-specific lab and field manual, produced jointly by lab and field staff, can facilitate the functioning of an archaeological field lab as an interactive part of both the initial research design and the field methodology of an archaeological project. The purposes of the manual are to make explicit and to standardize site-specific lab and field methodologies and to clarify staff roles and responsibilities in the project. An example of a site-specific lab and field manual is one developed for the Upper Delaware Valley Early Man Project's Shawnee-Minisink site. It demonstrates how a compilation of instructions, guidelines, and procedures such as those for the computerized methodology used at the site can provide valuable direction for both lab and field personnel and can serve as a teaching aid for field schools. (30)

Evans, Susan T. (Penn State) **SETTLEMENT AND LAND USE IN THE LATE HORIZON TEOTIHUACAN VALLEY** The Late Horizon (A. D. 1350 to 1521) in Mesoamerica marked a return of political hegemony to the Valley of Mexico, where a dense, circumscribed population was distributed among distinct polities, based on territorial, segmentarily organized ethnic enclaves. This paper presents a structural analysis of the interaction of environment, settlement pattern, land-use strategy, and political relations of the Teotihuacan Valley subsystem to investigate the ethnohistorically documented trend toward marked differentiation of access to key resources, as the peasant population is distributed over the most marginal agricultural land and elites secure access to the most productive areas. (9)

Farquar, R. M., Pavlish, and C. Fawcett (Toronto) **THE THERMOLUMINESCENCE (TL) EVALUATIONS OF THE YAGI AND HAMANASUNO SITES** Ceramic materials from the Yagi site located on the island of Hokkaido in Northern Japan are examined with respect to their TL capabilities. Comparison with the TL capability of materials from Hamanasuno, a site 4 km away, are made. The importance of understanding the surrounding geological and geomorphological environment is stressed as a key to interpreting the results (preliminary) obtained. The TL system employed by the University of Toronto is outlined. The scientific potential realized by interfacing Archaeology and Physics is stressed. (36)

Fawcett, C. (see Farquar, R. M.) (36)

Feinman, Gary (Arizona State) **CHANGES IN THE ORGANIZATION OF CERAMIC PRODUCTION IN PRE-HISPANIC OAXACA, MEXICO.** Recent interpretation of the settlement pattern data collected by the Valley of Oaxaca Settlement Pattern Project has suggested that the political organization of the region changed markedly during the pre-Hispanic period. A diachronic study of the relationship of settlement locations to land-use zones has suggested that the local exchange system underwent significant changes as well. Several lines of analysis have also suggested that the organization of ceramic production within pre-Hispanic Oaxaca changed through time. An interpretive model that relates the changing organization of pre-Hispanic ceramic production to changes in the political and economic networks will be proposed and evaluated. (5)

Ferguson, T. J. (Pueblo of Zuni) **APPLICATION OF NEW MEXICO STATE DEAD BODY AND INDIGENT BURIAL STATUTES TO A PREHISTORIC MUMMIFIED BODY** In September 1978, a mummified Anasazi body was offered for sale at an auction of Indian art and artifacts in Santa Fe, New Mexico. With the support of various groups, including the Navajo Nation, the Pueblo of Zuni successfully initiated action to block the sale of this body and to ensure that it was properly disposed of by reburial. The development of legal theory, the process of invoking relevant state laws, and the final disposition of the body are discussed. The utility of this action as a precedent for cultural resource management and its implications for the archaeological profession are considered. (8)

Fernstrom, Katharine (Southern Illinois) **THE EFFECT OF SUBSISTENCE STRESS ON EXCHANGE NETWORKS** Exchange networks are viewed as dynamic systems that are affected, in a predictable manner, by social systemic changes external to the networks. Nonlocal lithic raw materials from excavated sites on Black Mesa are used to measure fluctuations in the organization of local exchange networks. It is posited that in a period of subsistence stress, systemic reorganization will be reflected in a significant decrease in nonlocal lithic materials found on sites. (38)

Fetter, Sharon R. (Ohio State) **SUCCESSFUL USE OF BROWN'S PRESERVATIVE IN ALASKA** A preservative compound has been employed successfully at archaeological sites throughout Alaska. All types of materials ranging from baleen and ivory to barely visible bone imprints have been recovered from different sites and highly variable soil matrices. This paper recounts the problems, successes, and failures encountered in three years' work with the preservative and offers hypotheses for further testing of the preservative that may easily (and cheaply) solve many an archaeologist's field and subsequent preservation problems with regard to perishable archaeological materials. (34)

Fitting, James E. (Gilbert/Commonwealth) **ARCHAEOLOGISTS AS REAL LIVE PEOPLE** Archaeological contracting has caused the recognition of conflicting roles among archaeologists. Archaeologists need to consider more than resources in their roles as citizens, scholars, and contractors. The most neglected area of the moment seems to be the consideration of themselves and their colleagues as real live people. (17)

Fitzhugh, William W. (Smithsonian) **TORNGAT ARCHAEOLOGICAL PROJECT: 1978 FIELD REPORT AND PRELIMINARY CONCLUSIONS** A comprehensive two-year survey of northern Labrador between Okak and Hudson Strait was completed successfully in 1978. This research, building on work farther south, considerably expands information on such questions as culture history and ethnic identity, prehistoric populations, boundaries, cultural relationships, and environmental considerations. Highlights from the 1978 field season are presented together with preliminary conclusions from research to date. The use of these data for approaching problems of Eastern Arctic and Subarctic archaeology is considered and the relative merits of scale in research of this type. (35)

Fladmark, Knut (Simon Fraser) **A PALEOECOLOGICAL MODEL FOR NORTHWEST COAST PREHISTORY RE-EXAMINED** In 1974 I proposed a tentative explanatory model for the prehistoric development of the Northwest culture pattern based on paleoenvironmental determinates. This

paper reexamines this model in the light of new data. It will be shown that while there is still temporal synchronicity between the attainment of quasi-stable sea levels and the appearance of large shell middens ca. 5000 B. P., cultural ecological mechanisms linking these phenomena are less clear than originally thought. (43)

Fleischer, Mark (see Gleeson, Paul) (43)

Flenniken, J. Jeffrey (Washington State) REPLICATIVE SYSTEMS ANALYSIS OF THE HAFTED LITHIC ARTIFACTS FROM THE HOKO RIVER WET SITE This is a preliminary report on replicative systems analysis of the hafted lithic artifacts from the Hoko River wet site. This method of analysis is particularly applicable to wet or frozen site conditions where several subsystems of one lithic system may be preserved. Replicative systems analysis involves replicating the entire technological lithic system from the selection of raw materials, reduction of raw material into preconceived tools, hafting of selected tools through functions of the hafted tools. Aboriginal artifacts are employed as experimental controls. This specific technological system has been named the "Hoko Systemic Bipolar Microlith Technology." (37)

Florian, Mary-Lou E. (B. C. Provincial Museum) ANALYSIS AND A COMPARISON OF ARCHAEOLOGICAL WOOD SAMPLES FROM A FROZEN AND WET SITE Wood samples from the archaeological frozen sites Creswell Bay sites PcJq-5 and PeJr-1 on Summerset Island and the wet site the Lachane site GbTo-33 at Prince Rupert B. C. were examined. Analyses and a comparison of the biodeterioration and from physical and chemical characteristics of the woods are presented. The analyses suggest (1) that it is possible to separate woods that are site contaminants, artifacts, and incidental vegetal samples; (2) conservation needs of individual samples; (3) cultural components of fabrication, use, and wood species origin. The comparison suggests differences due to the different burial environments.(37)

Foley, Robert (Durham, Great Britain) A REGIONAL APPROACH TO THE STRUCTURE OF ARCHAEOLOGICAL MATERIALS The traditional archaeological bias towards sites as the appropriate frame for sampling and study has continued to manifest itself even within relatively sophisticated spatial studies and approaches to prehistoric energy capture systems. This bias effectively excludes from consideration a vast realm of behavioral information relevant to the very issues addressed in such studies. Recently, however, a number of archaeologists have turned their attention to so-called off-site or non-site archaeology. This paper seeks to outline the types of information implicit in artifact distributions not normally viewed as "sites" by the archaeologists. A behaviorally based model for the regional structuring of archaeological material will be presented.(33)

Folk, Robert L. (Texas) TELL YINAM, GALILEE, ISRAEL Tell Yinam was built in the down-faulted Yavne'el Valley beneath a scarp of Miocene basalt. It was located on an alluvial fan that provided water, building stone, and fertile soil. The Tell has been selectively calcified, probably because of Ca contributed by burning of firewood. A 13th-century B. C. iron smeltery utilized local limonite ore; abundant deposits of opal phyloliths, slag, and burnt clay attest to the industrial site. A plastered mikveh is being dated by C<sub>14</sub>. Most structures are oriented to the rising point of Sirius, but the mikveh faces east (probably a Jewish orientation). (47)

Fonseca, Z., Oscar (Costa Rica) GUAYABO DE TURRIALBA: REEXCAVACION DE UN SITIO ARQUITECTONICO TARDIO DEL ATLANTICO COSTARRICENSE La primera excavación científica en Guayabo de Turrialba (Aguilar 1972) fue muy superficial, dejando sin conocer la mayor parte del sitio. Con la reexcavación se pretende un conocimiento detallado del mismo como un todo, estableciendo la gama de variación arquitectónica y funcional, lo que permitirá analizar la interrelación o mecánica que existía los varios sectores del sitio. Esto se logrará con una cuidadosa excavación horizontal de los rasgos, con énfasis en las zonas de actividad cotidiana. Simultáneamente se hará un nuevo estudio cronológico, con calas, en vista de que las primeras calas estratigráficas en el sitio fueron hechas en montículos. (28)

Ford, Richard I. (Michigan) STORAGE OF ARCHAEOLOGICAL COLLECTIONS Many archaeologists regard storage facilities as garbage compactors: as long as the modules are the same, it does not matter what goes in them. In fact, archaeological evidence is quite heterogeneous, and storage facilities should reflect this variability. Similarly, accessibility to stored collections is time dependent: some are used daily, others occasionally, and a few rarely. By planning in advance for how a collection will be used and under what circumstances, appropriate storage areas and facilities can be built or reorganized with a considerable saving of staff time and money for curation. (31)

Ford, Richard I. (see Cowan, C. Wesley) (29)

Fowler, William R., Jr. (see Lubensky, Earl H.) (27)

Francis, Julie E. (Arizona State) THE USE OF LOG-LINEAR MODELS AS AN ANALYTIC TECHNIQUE FOR ARCHAEOLOGICAL DATA Although the Chi-square test for independence is probably one of the statistical tests most widely used by archaeologists, relatively little attention has been directed toward a series of more useful analytic techniques that elaborate upon the Chi-square test—log-linear models. Log-linear models can be used to analyze associations between two or more multivariate, nominally scaled variables. An outline of the technique is presented, including assumptions, models, and test statistics. Log-linear techniques are used in a functional analysis of chipped stone artifacts from a small habitation site in central Arizona. The utility of log-linear methods to archaeological data is evaluated. (12)

Freeman, Leslie G. (Chicago) RESEARCH ON EARLIER MAGDALENIAN LIFEWAYS IN CANTABRIAN SPAIN Excavations were begun at the Cantabrian cave site of "el Juyo" in 1978, to determine whether suggestions of an earlier Magdalenian shift in subsistence strategies and related activities provided by earlier excavations there and elsewhere in Cantabria could be proved or disproved. The top four Magdalenian III levels in the deep stratigraphy have now been sampled. In addition to large faunal and artifact collections, the top two levels contained hearths and large dugout structure complexes. The three top levels differ in faunal and artifact representation, and clear differences in the spatial distribution of recovered materials are also evident. The fourth is a true shell midden. This work is clarifying the original problems posed, and comparison of data from this and other sites will permit eventual placement of el Juyo's horizons in an overall picture of regional Magdalenian subsistence/settlement strategies. (23)

Fricke, Mary Lou (SUNY-Binghamton) RE-INVESTIGATION AND RE-EVALUATION OF THE BURIAL ROOMS AND ROOM 28 AT PUEBLO BONITO Unpublished excavation notes on Pueblo Bonito from the Hyde Expedition and the National Geographical Expedition to Chaco Canyon have recently been collated. In addition, an analysis of the skeletal remains and photographs of 1,000 reconstructed ceramic vessels from Bonito are available. This report concentrates on a reanalysis and comparison of burial rooms 320, 326, 329, 330, 32, 53, and 56 and Room 28 of Bonito as evidenced by associations between aspects of different material systems within these rooms, with emphasis on the intraroom and interroom stylistic variability in ceramics. (8)

Frison, George C. (see Shaw, Leslie) (45)

Frison, George C. (see Walker, Danny N.) (25)

Fulbright, H. J. (see Early, Ann M.) (32)

Futch, Robin S. (Louisiana State) HUMAN ECOLOGY AT THE MORTON SHELL MOUND SITE, LOUISIANA This paper is concerned with human-environmental relationships that existed with a Troyville-Coles Creek population in coastal Louisiana, ca. 700 B. C.-1100 B. C. and the ways in which this relationship is manifest in the faunal remains left by the site's inhabitants. Analysis of both the human and nonhuman skeletal remains recovered in excavations at the site adds great insight into the subsistence patterns of these peoples and the resultant effects on the general health of the site's inhabitants. Based on these analyses, a review of the paleoecology of the area during Troyville-Coles Creek (late Woodland) periods is presented. (40)

Gadacz, René R. PRE-CONQUEST TRADE ORGANIZATION IN TABASCO, MEXICO Commercial production of cacao beginning during the Late Formative in the lowlands of Tabasco led to a spatial strategy whereby route access and a specific agricultural orientation became cardinal in the maintenance of internal coordination. This is expressed by specific function settlement correlates previously unrecognized. Regional task decentralization and political centralization were achieved by the coordination of administration, distribution, and production centers, each center located within a specific ecological zone particular to its designated function. Spatial trends are distinct and reflect politico-economic strategies that later became deliberate institutional policy and a source of conflict. (46)

Gallagher, James P. (Wisconsin-La Crosse) THE DAYTON SITE, A FORTIFIED VILLAGE IN SOUTHWESTERN WISCONSIN The Dayton site is an Upper Mississippian/Oneota village located on the La Crosse River close to its confluence with the Mississippi. The two-acre village contains houses and storage and fire pits and is surrounded by a stockade. Artifacts indicate typical Orr Focus Oneota cultural affiliation with Mississippian influences. Excellent faunal preservation indicates a highly diversified subsistence base. (29)

Gamble, Geoffry (see Gleeson, Paul) (43)

Gibson, Eric L. (Kentucky) and Mark C. Chavez (Environment Consultants) ANALYSIS OF A RIVERBANK ACTIVITY AREA FROM THE CLAH-CHEH-LAH SITE (45-SA-11), NORTH BONNEVILLE, WASHINGTON The analysis of artifactual material and cultural features from the riverbank activity area at 45-SA-11 contributes a large body of information toward understanding the utilization patterns of areas on the river terrace at the Chinook village of the Clah-cheh-lah. Activities represented in the archaeological record from the riverbank depict a multiple-use pattern focused not only on the riverine occupations of salmon-drying, net storage, and canoe mooring but also on nonriverine activities such as manufacture and maintenance of hunting tools, butchering, hide preparation, and plant food processing. (3)

Gifford, Diane (California, Santa Cruz) THE THIRD DIMENSION IN SITE STRUCTURE A crucial but seldom addressed issue in the explication of site structure and in inference of behavior from spatial data is the nature and determinants of vertical distribution of debris. The vertical aspect of "beds" or "cultural horizons" has not been successfully explained in most archaeological literature. Ethnoarchaeological and experimental research on the interaction of treadage and trampling, substrate, and debris allows us to begin to untangle this problem. This paper reports on our research on vertical dispersion and its application to understanding selected archaeological occurrences. (33)

Gifford, John A. and George R. Rapp, Jr. (Minnesota) THE ARCHAEOLOGICAL GEOLOGY OF TROY 356 sediment samples from all nine cultural periods of ancient Troy in northwestern Anatolia were collected in 1937 by the University of Cincinnati Expedition to the Troad. Analyses of these samples at the University of Minnesota Archaeometry Laboratory, from 1976 to the present, are here reported under the general categories of radiocarbon dating, sediment analysis, phosphate analysis, pollen analysis, phytolith analysis, and earthquake studies. These new data will supplement the cultural interpretation of Blegen et al. as published in the *Troy* excavation volumes. (47)

Gilbow, Delbert (see Gustafson, Carl E.) (34)

Gilman, Antonio (California State University-Northridge) THE ECONOMIC BASIS OF COPPER AND BRONZE AGE CHANGE IN SOUTHEAST SPAIN. The main trends of culture change in the rich Copper and Bronze Age sequence of southeast Spain reflect an autochthonous development of social stratification. The regionally differentiated pattern of this development and the empirical results of site catchment analyses for prehistoric settlements in southeast Spain indicate the importance of irrigation in Copper/Bronze Age culture process. Capital intensification of subsistence technology (such as irrigation in southeast Spain) is seen as the infrastructural mainspring of European Bronze Age social change. (23)

Gladfelter, Bruce G. (Illinois-Chicago Circle) GEOMORPHIC CONTRIBUTIONS TO ARCHAEOLOGICAL INTERPRETATIONS IN A FLOODPLAIN SETTING The geomorphic dynamics of a floodplain setting offer one of the most complex environments for understanding the contexts of archaeological materials. Interpretation of surface and buried artifacts in such a setting must consider the evidence for geomorphic change in the floodplain in general and at a site in specific. This is illustrated by examination of an area of the Mississippi floodplain in the vicinity of East St. Louis where (1) Archaic materials may be found on the present surface and in buried contexts, while  $C^{14}$  dates in this time range derive from up to 60' below the present surface, and (2) Archaic material is found in deposits stratigraphically above Woodland and Mississippian contexts. Resolution of such apparent conflicts is best served by the collaboration of the geomorphologist and the archaeologist. (47)

Glassow, Michael A. and Larry R. Wilcoxon (California-Santa Barbara) A COMPARISON OF ABORIGINAL COASTAL ADAPTATIONS NORTH AND SOUTH OF POINT CONCEPTION, CALIFORNIA Point Conception, California, has long been recognized as an environmental dividing line between the south-facing coast of the Santa Barbara Channel and the west-facing coast extending generally north of the point. The archaeological records on either side of this dividing line are different in many respects, in large part because of differences in subsistence strategies. This paper investigates the environmental factors affecting these strategies, as well as the economic factors such as procurement costs and food values that underly the strategies. (24)

Gleeson, Paul, Mark Fleischer, and Geoffry Gamble (Washington State) ECONOMIC ROLES OF NOOTKAN INTRAHOUSE RANKED POSITIONS Although the living places within ethnographic Nootkan dwellings are known to have been ranked, few data exist on the dynamics among the ranked positions. Spatial distribution of archaeological data within the first structure excavated at Ozette indicates that the relationship between the first and the second positions may have been that of executive and administrator. Development of these specialized roles within the

house unit may reflect and be useful in discussing the rise of complex, densely populated villages on the coast. (43)

Goldstein, Lynne (Wisconsin-Milwaukee) ONE DIMENSIONAL ARCHAEOLOGY AND MULTI-DIMENSIONAL PEOPLE: SPATIAL ORGANIZATION AND MORTUARY ANALYSIS Many mortuary site analyses tend to be unidimensional, with emphasis on status distinctions. Explanations for differentiations are seldom determined. A shift toward a multi-dimensional framework using polythetic definitions is necessary. This is most easily accomplished by using space as the organizing principle. Various spatial-analytic techniques are critiqued, and one that is more appropriate for mortuary analysis is presented. Several levels of spatial analysis are needed, each of which represents a different level of relationships. Using Mississippian as an example, the approach is outlined, and the importance of simple visual techniques for hypothesis generation is stressed. (13)

Goodsitt, Rochelle L. (Northwestern) and Ruthann Knudson (Idaho State) FUNCTIONAL ANALYSIS OF CHIPPED STONE TOOLS FROM THE AYACUCHO VALLEY To determine the range and frequency of the tasks performed at three sites (seven components) in different environmental zones of the Ayacucho Valley, information on edge angle, edge configuration, and microwear pattern was used to develop a method for analyzing many of the attributes that had been recorded for functional units along the edges of stone tools. Each unit was assigned a probable task for which it had been used, e. g., scraping soft material or sawing hard material; each unit was plotted spatially. Edges assigned to similar functions seem to cluster, and it was determined that similar kinds of tasks were performed in all components but with different frequencies. (1)

Gordon, Claire C. and Jane E. Buikstra (Northwestern) SOIL PH, BONE PRESERVATION, AND SAMPLING BIAS AT MORTUARY SITES Because mortuary site archaeology has become increasingly important in the scientific investigation of cultural and biocultural interactions and change, sampling errors at these sites have become a primary concern. Though acidic soil is frequently cited as a major contributor to sampling bias through poor preservation of inhumed remains, few if any researchers have attempted to quantify this relationship for predictive purposes. It is suggested here that a pH-preservation relationship can be quantified and should be used by researchers in choosing mortuary sites that, if properly excavated, will yield a maximum of skeletal information. (29)

Gorman, Chester F. (see White, Joyce C.) (42)

Gorman, Frederick J. E. (Boston) MODELS OF PREHISTORIC CRAFT PRODUCTION: A CONTRIBUTION FROM INDUSTRIAL ARCHAEOLOGY Recent theoretical developments in industrial archaeology can be used to improve models of bulk handcraft production in prehistory. An anthropological approach to industrial archaeology has evolved, which investigates the interaction between social and technological dimensions of industry through use of an analytic framework that is also applicable to similar study of extinct protoindustrial craft organizations. The framework integrates aspects of operations research and organization theory in a manner that yields a set of fundamental decisions of a cross-cultural nature. Contemporary and historical industries are known to have confronted these decisions, and prehistoric craft organizations are likely to have acted on them as well. (21)

Gorski, Linda A. (Missouri-Columbia) MICROSTRATIGRAPHY AT THE CARLSTON ANNIS SITE Some archaeologists have assumed that shell middens have no stratification because differences in soil color and texture are not apparent. Although the soil matrix may be undifferentiated, the objects in it—shells, rocks, artifacts, and other materials—were not deposited simultaneously. In such a case, the stratification must be inferred from the deposition of the objects themselves. Pressurized water, misted over the profiles, heightens color and textural distinctions and clarifies the depositional angle of objects. Detailed drawings of objects in the profiles delineate the major stratigraphic layers within the midden, and a depositional sequence can be hypothesized. (16)

Grabert, Garland F. PEBBLE TOOLS AND TIME FACTORING Pebble tool assemblages have for many years been one of the more puzzling lithic groups in the Pacific Northwest. They have been viewed as chronological markers, as indicators of task-specific sites, and as remains of distinct cultural entities. They sometimes seem to be the only visible part of certain regional site components. A variety of lithic tools often accompany the pebble tool complex. Assemblages of both kinds have been recorded and examined by the writer in both littoral and upland sites. Pebble tools need not be chronological markers. While coastline changes may have occurred in post-glacial times, several of these sites have always been within a few hundred meters of a coast though the elevations above sea level have changed. Experiments are under way to determine

pebble tool utility in different tasks. Context and association are variables that must be controlled before temporal factors can be expressed. (34)

Grabert, G. F. (Western Washington) INLAND SITES OF THE CENTRAL NORTHWEST COAST AREA Much archaeological research has been carried out on coastal sites of the Northwest. Far less has been directed to problems in interaction between prehistoric peoples of the coast and those in the adjacent foothills regions. Inland sites are frequently small and lack distinctive shell middens. In the aggregate, though, these sites represent parts of community resource collection areas and may sometimes be related to historic tribal locations. What may be interpreted as technically impoverished sites may well be residues from a limited-activity location, segments of an economic subsystem. (43)

Graham, Mark M. (UCLA) SYMBOLIC AGRICULTURE: UTILITARIAN SOURCES OF ELITE ART IN GUANACASTE PROVINCE, COSTA RICA The social function and meaning of the ceremonial *metate* or grinding stone in Guanacaste Province are investigated from an art historical perspective. An attempt is made to resolve the contradiction of a ceremonial emphasis on a type of *metate* associated with maize cultivation in Mesoamerica by societies in Costa Rica for whom maize cultivation was not a dominant subsistence mode. It is argued that the sources of the Guanacaste *metate* tradition are to be found in southern Mesoamerica, specific sources are proposed and examined, and their implications for an understanding of the Guanacaste tradition are considered. (28)

Gratton, D. W. (see McCawley, J. C.) (37)

Graves, Michael W. (Arizona) ESTIMATING TREE RING CUTTING DATES ON SPECIMENS LACKING OUTER RINGS A method for estimating outer ring loss on archaeological tree ring specimens is proposed. This method, based on work presented by S. Plog (1977), is tested using tree ring data from east-central Arizona. Results of these tests are employed in the interpretation of the tree ring dates from the Grasshopper Ruin. Architectural and stratigraphic evidence from the site is used to evaluate and provide alternatives to the tree ring interpretation. (7)

Grayson, Donald K. (Washington) ARCHAEOLOGICAL VERTEBRATES AND PALEOENVIRONMENTAL RECONSTRUCTION Archaeological vertebrates have long been employed as a source of information on past environments. Much of this use has been uncritical, with little attention paid to the nature of the archaeological faunal sample, to the meaning of statistical manipulations of that sample, or to the biology of the organisms involved. These and other problems relating to the paleoenvironmental interpretation of archaeological vertebrates are reviewed in general and in terms of specific studies. Limitations inherent in extracting paleoenvironmental information from archaeological faunas are outlined, and suggestions are made for a more productive use of such faunas in the reconstruction of past environments. (25)

Greber, N'omi (Cleveland Museum of Natural History) TYPES OF SOCIAL INFORMATION DERIVABLE FROM VARIOUS DATA HANDLING TECHNIQUES, WITH APPLICATION TO OHIO HOPEWELL Some difficulties in matching the desired results, the available data, and possible data-handling techniques are briefly discussed. Examples of the application of different data-handling techniques to the same data set are given, as well as examples of similar methodologies applied to different sets. The data sets are formed from mortuary populations within and across major classic Ohio Hopewell sites, including Mound City and Hopewell itself. The results are discussed with particular reference to intersite relationships. (13)

Green, Stanton W. (South Carolina) and Stephen M. Perlman (Virginia Commonwealth) UNDERSTANDING ARCHAEOLOGICAL SITE FORMATION: A SIMULATION APPROACH. Recently archaeology has stressed the analysis of site formation processes. These processes are usually associations between ethnohistoric or ethnographic statements or direct observations of behavior and their material by-products. The behavioral associations are assumed to be capable of explaining archaeological observations. However, without a theoretical foundation linking the particular and the general, these particular observations cannot be used to interpret prehistoric remains. Instead, by developing explicit theoretical models relating behavior to site formation, expected archaeological outcomes can be simulated. These outcomes are controlled experimental data sets that can, by comparing the expected and the observed, provide information about a prehistoric site's activities. (2)

Green, Stan (see Moore, James A.) (20)

Grossman, Joel W. (Rutgers) THE GROUND PENETRATING RADAR SURVEY AT RARITAN LANDING Subsurface tests, documentary research, and the use of a ground penetrating radar survey

have documented the complexity and boundaries of an eighteenth-century archaeological site across the Raritan River from the modern city of New Brunswick. Remains of the Raritan Landing, a major entry port during the Revolution and later, are buried in situ beneath two or three feet of shale fill. The extent of the deposit was delineated with a ground-penetrating radar unit with resolution useful in archaeological contexts, between 5 inches and 5 feet. Data from 12 miles of radar scans were visually translated into a polychrome code indicating the relative depth of superimposed stratigraphic interfaces, showing the complexity, location, and size of buried remains. (6)

Guderjan, Thomas H., James R. Morehead, and A. Frank Servello (Southwestern Louisiana) DEFINITION OF CULTURAL STRATIGRAPHY AT FORT POLK USING POLYTHETIC CLASSIFICATION SCHEMES Polythetic classification of lithic debitage is integrated with monothetic typology to develop a cultural stratigraphic sequence for the cultural resources management program at the Fort Polk Military Reservation, Louisiana. Cultural entities representing known strata, dating from the late Pleistocene to the recent Holocene, are compared with entities of unknown strata by a clustering technique. The resulting dendrograms graphically display the relationships based upon similarity among entities, enabling the unknown entities to be placed in a stratigraphic framework. (12)

Gumerman, George J. (Southern Illinois) THE LETTER VERSUS THE SPIRIT OF THE LAW IN CONTRACT ARCHAEOLOGY Early legislation was used by academic, scholarly archaeologists as a lever for obtaining funds for archaeological research of endangered sites on federal lands, in spite of the fact that both the spirit and the letter of the law were to protect sites from vandals. Recent legislation permitting large sums of money to be spent on archaeological investigations has produced good archaeology. But it has also permitted many nonscientific, mechanical investigations as well as very expensive, narrowly conceived research programs, neither of which is in the spirit of the legislation. Clearly the ethical dilemma has to be resolved by bringing the letter and the spirit of the pertinent legislation together. (17)

Gustafson, Carl E., R. D. Daugherty, and Delbert Gilbow (Washington State) THE MANIS MASTODON SITE: EARLY MAN ON THE OLYMPIC PENINSULA The Manis site on the northern Olympic Peninsula near Sequim, Washington, has yielded evidence that a mastodon was butchered there approximately 12,000 years ago. A bone "projectile point" imbedded in a mastodon rib and other artifacts made of bone and tusk have been recovered. A single cobble spawl tool is the only distinguishable stone artifact associated with the mastodon bones. By 12,000 years ago, coniferous forests had not yet invaded the northern Olympic Peninsula, and shrub-tundra vegetation characterized the region. Evidence of later occupation at the site is provided by a leaf-shaped, basalt "Olcott" point found directly above a layer of volcanic ash derived from Mt. Mazama. (34)

Hackenberger, Steven (Washington State) DECISION CRITERIA, ECONOMIC STANDARDS OF LIVING, AND HOMEOSTATIC POPULATION REGULATION Standards of living act as buffers in homeostatic population regulation by fixing acceptable levels of resource procurement and maintaining population below levels at which maximum resource procurement is required to maintain the population. Simulations are used to compare the alternative operation of optimizing and satisficing decision criteria as determiners of standards of living and population regulation in hunter-gatherer economics. Results indicate the manner and degree to which satisficing criteria may operate in mixed-goal decision making to determine rates of population change given resource fluctuation. The satisfactions of goal conflicts are shown to act as economic standards that may buffer populations from resource shortages in homeostatic population regulation. (20)

Hall, Stephen A. (North Texas State) POLLEN EVIDENCE FOR LATE HOLOCENE ENVIRONMENTS IN THE SOUTHERN PLAINS The numerous attempts to obtain pollen sequences from late Holocene archaeological sites in the Southern Plains have resulted in dated pollen diagrams from only three sites, all in northeastern Oklahoma. The pollen record from these sites, representing the time interval A.D. 300 to 1250, indicates an oak forest vegetation such as exists at these localities today. Increased hickory pollen frequencies during the period A.D. 400 to 1050, with maximum hickory abundance occurring about A.D. 600, may reflect a period of more moist climate. The decline of hickory beginning A.D. 600 shows a return to drier conditions, a climatic trend that may have persisted to the present. Dated pollen records from both archaeological and nonarchaeological sites in the Southern Plains are essentially absent for the time periods A.D. 1300 to present and 3000 B.C. to A.D. 300. (50)

Ham, Leonard C. (British Columbia) SEASONALITY OF SHELL MIDDEN LAYERS AND VARIATIONS IN SUBSISTENCE ACTIVITIES AT A NORTHWEST COAST SITE It is generally agreed that the cultural complexity and population density of Northwest Coast culture were at least in part tied to subsistence and the efficiency of the seasonal round. This study is concerned with the



nature of subsistence activities at a portion of the Crescent Beach midden dating A.D. 600-1500. Given the nature of the local environment and ethnographic subsistence patterns, it is possible to predict the types of cultural debris expected from subsistence activities at different seasons. A wide area excavation isolated 31 stratigraphic layers, seasonal groups of layers exhibiting marked differences in types of cultural remains and hence inferred subsistence activities. The isolation of depositional units and determination of accurate seasonality dates from clam growth rings facilitated reconstruction of archaeological subsistence patterns and predictions about the nature of subsistence patterns of earlier periods. (24)

Hamblin, Nancy L. (Arizona) THE MAGIC TOADS OF COZUMEL Nearly 300 amphibian bones were excavated from six prehistoric Maya sites on the island of Cozumel, Mexico, in 1972-1973 by the Cozumel Archaeological Project. Of these, the overwhelming majority have been identified as the large marine toad *Bufo marinus*, and most are from burial contexts. Discussion will focus on the probable utilization of this animal for ceremonial hallucinogenic purposes by the Cozumel Maya. (27)

Hamilton, T. D. (see Ackerman, R. E.) (34)

Hammond, Norman and Sara Donaghey (Rutgers) CUELLO: EXCAVATIONS OF 1978-9 The Cuello site in northern Belize has in recent years yielded an interesting early radiocarbon chronology covering the Early to Late Formative, with associated buildings, burials, occupation deposits, and ceramic and other artifacts. The excavations at the site in summer 1978 and spring 1979 are described, together with results of the most recent radiocarbon dating program. Further intended research at the site in 1980 is outlined. (10)

Hanes, Richard C. (Bureau of Land Management) LITHIC TECHNOLOGY IN THE OWYHEE UPLANDS, OREGON Analysis of chipped stone assemblages from Dirty Shame Rockshelter in southeastern Oregon has provided data indicating a temporal fluctuation in regard to the extent of activities performed at the location. The site, occupied between 9500 and 400 B.P., was segregated vertically by means of radiocarbon dates and exposed features into six cultural zones. These zones constituted the comparative units for the present study. The analyses focused on raw material acquisition, including trace element analysis, detailed flake attributes, bifacial forms, use-wear indicators, and tool morphologies. (41)

Hansen, Greta and Susan Paterson (George Washington) CONSERVATION OF MIDDLE DORSET WET ORGANIC SPECIMENS FROM NORTHERN LABRADOR During the 1978 field season, a unique collection of perishable Middle Dorset (paleo-Eskimo) artwork, tools, and other organic specimens was excavated from deep, frozen midden deposits on Avayalik Island off the coast of northern Labrador, Canada. These specimens are between 1500 and 2000 years B.P. The materials include ivory, wood, bone, hide, fur, and baleen. The conservation/preservation of this collection has presented a number of problems, because of the large quantity and diversity of material recovered and the generally water-saturated condition of most specimens. These problems are discussed, and several alternative solutions are suggested. (37)

Hantman, Jeffrey L., Kent G. Lightfoot, and Steadman Upham (Arizona State) THE IMPLICATIONS OF CHANGING CERAMIC PRODUCTION IN THE PREHISTORIC AMERICAN SOUTHWEST Findings from preliminary investigations concerning patterns of ceramic manufacture and distribution are discussed for the region surrounding the Little Colorado River and its tributaries. Petrographic and stylistic analyses of black-on-white, orange ware, and polychrome ceramics suggest changes in the organization of production over a 700-year period. Settlement pattern data for this region indicate complex, hierarchical relationships between sites of varying size with increasing population agglomeration through time. A structural model is presented that relates changes in settlement patterns to changes in the mode of ceramic production. (14)

Hardesty, Donald L. (Nevada-Reno) NICHE THEORY AND PATTERNS OF ECONOMIC DIVERSITY Niche theory is emerging in ecology as an explanation for diversity patterns among species. It holds some common assumptions with economic theory and may be useful in explaining evolutionary patterns of economic diversity in humans. Several relevant aspects of niche theory are examined. Particular attention is given to a set of mathematical models that predict a "limiting similarity" for niches and thus imply that economic diversification will increase to a known limit and stop. These and alternative models are tested with documentary data on colonial South Carolina and with archaeological data on several well-documented regions. (21)

Harris, Kevin (Nevada) THE SOCIAL AND ECONOMIC FUNCTIONS OF CHINOOK TRADE The archaeological, ethnographic, and historical records of the Chinook trading system are examined to delineate the types of commodities exchanged, their respective valuations, market partici-

pants and trade routes, the mechanics of the exchange system, the diachronic development of the prehistoric system into the historic fur trade, and finally the social and economic functions of the resultant resource redistribution and cultural interaction in Chinook society. It is suggested that the archaeological distribution of trade objects can be examined as an index of change in cultural affiliation and socioeconomic structure. (3)

Hart, William J. (Museo de Historia Natural, San Salvador) LOCALIZED TUFFS OF ZAPOTITAN A study of three localized volcanic tuffs, all related to the same volcanic complex, each containing individual characteristics and each separated by a paleosol. The Cerén tuff, 510 ± 135 years, consists of 25 recognizable subunits varying from fine grain to bombs. The San Andrés tuff, a basaltic ash, twelfth century, was the result of a phreatic-maar eruption; the El Playon formation, A.D. 1658, andesitic ash-scoria fall with a lava flow, during the formation of a cinder cone of the same name. (11)

Hart, William J. (see Steen-McIntyre, Virginia) (11)

Hartley, Emily (Washington State) AN EVALUATION OF VARIOUS METHODS OF WET WOOD CONSERVATION The treatments compared will include Carbowax, freeze-drying, acetone-rosin, and orthosilicate. Their effectiveness on hardwoods and softwoods of varying ages and from different types of sites will be discussed, as well as (1) chemical and physical processes of the treatment that contribute to the preservation of the wood, (2) stability of the treated material, (3) outward appearance of the material after treatment, (4) effect of treatment on future accessibility (handling and storage), and (5) applicability of treatment (economics and range of application). (37)

Hassan, Afifa Afifi and Fekri A. Hassan (USGS, Washington State) THE MINERALOGY AND GEO-CHEMISTRY OF ARCHAEOLOGICAL SEDIMENTS Archaeological sediments display spatiotemporal variations in the concentration of phosphorus, carbonate, nitrogen, carbon, iron, hydrogen ions, and trace elements, as well as variations in the presence and frequency of sedimentary minerals. These variations reflect contributions from parent rock materials and anthropogenic sources modified by penecontemporaneous transformations and subsequent diagenetic and pedogenic changes. Analysis of the geochemistry and mineralogy of archaeological sediments may thus be employed for paleoenvironmental and cultural interpretations. (47)

Hassan, Fekri A. (Washington State) GEOLOGY AND SUBSISTENCE-SETTLEMENT STUDIES IN ARCHAEOLOGY Application of sediment microarchaeological techniques and geomorphological investigations provide valuable tools for the study of subsistence-settlement systems in archaeology. Microarchaeological analysis is a means of retrieving evidence for on-site subsistence and other activities and for the spatial distribution of these activities. Geomorphological investigation, as Geokistic Analysis, contributes to an understanding of the subsistence potential of a region, the possibilities of land use, the boundaries of site catchment territories, annual scheduling of subsistence activities, and site locations that maximize economic gain and minimize exposure to geologic hazards. (47)

Hassan, Fekri A. (see Hassan, Afifa Afifi) (47)

Hatch, James W. (Penn State) STATUS-SPECIFIC NUTRITIONAL STRESS IN A MISSISSIPPIAN CHIEFDOM The examination of a burial population from the Dallas phase, a series of Mississippian period chiefdoms from eastern Tennessee, has revealed significant individual variation in a spatially and temporally sensitive network of social status relationships.

Given this organizational backdrop, three dimensions of physical variation are examined for each status category: status, growth arrest (Harris) lines, and certain trace elements (through neutron activation). Hypotheses will be tested regarding possible status-specific vectors of nutritional stress, comparing the results with existing models of chiefdom-level economics that emphasize chiefly altruism or deprivation in the community-wide circulation of foods. (13)

Hauck, F. Richard (Archeological-Environmental Research Corp.) ESSENTIALS AND POTENTIAL OF THE RESEARCH-ORIENTED INDEPENDENT ARCHEOLOGICAL FIRM Private archaeological research firms are often stereotyped as being small project-oriented, uninterested in pursuing research objectives, and primarily motivated by financial opportunism. In certain instances, this identification has been correct. The private corporation can develop research capability and can initiate specific research designs. The archaeological data and funds needed for such an orientation can be obtained through industrial consulting and government contractual projects with careful planning. The purpose of this paper is to identify the methods that permit the private institution the latitude for conducting the complete range of archaeological research without loss of its inherent commitment to industry. (4)

Hayden, Brian (Simon Fraser) INTERACTION THEORY: ANOTHER MISSING LINK Given that the development of interaction theory is essential for adequate interpretation of behavioral patterning in archaeological remains, a framework for the development of interaction theory is presented within the context of ethnoarchaeological research conducted in the Mayan Highlands. Principal distinctions include interactions between vs. within communities, varying reasons for interacting, and varying types of interaction. Intercommunity interactions can be characterized usefully according to community types, and a kinship-free analysis of interaction within communities is explored. (26)

Hedlund, Gerald C. (Green River) LITHIC MATERIALS FROM INLAND CULTURAL SITES ON THE ENUMCLAW PLATEAU IN WESTERN WASHINGTON Five sites have been excavated, tested, and systematically surface collected on the Enumclaw Plateau. Numerous artifacts and chipping detritus have been found and studied. The most common functional class of artifacts found were utilized flakes. Other tools, such as scrapers, points, cobble-core choppers, edge-ground cobbles, perforators, burins, and graters, were also common. The number of burins and graters may indicate the use of bone and wood industries that have not been preserved. A variety of techniques were used to make these tools, including the Levallois Core method, microblade cores, and polyhedral blade cores. (42)

Heitha, Sam (see Rohn, Arthur H.) (50)

Henderson, T. Kathleen (Arizona State) SITE AGGREGATION AND SETTLEMENT SYSTEM AT CHAVEZ PASS, ARIZONA Preliminary results of an intensive survey conducted in the vicinity of Chavez Pass, Arizona, indicate increasing aggregation of sites over time. The patterning of this aggregation is examined using a variety of spatial techniques, including nearest neighbor and point pattern analysis. Attention is focused on the relationship between the spatial patterning of sites and the structural and organizational characteristics of the settlement system. Possible determinants of the aggregation pattern are also discussed. (8)

Henry, Donald O. (Tulsa) QUANTITATIVE ASPECTS OF A LITHIC REDUCTION SEQUENCE The application of quantitative observations to a lithic reduction sequence enables the lithic analyst to define the parameters of reduction stages precisely and to identify curation modes accurately. A fundamental advantage of a quantitative approach to lithic reduction over the traditional use of qualitative attributes (cortical elements, noncortical elements, etc.) is in being able to measure levels of core and biface exhaustion. (38)

Henry, Kathleen Cooper (Oklahoma) THE EFFECTS OF DIFFERENTIAL RECOVERY STRATEGIES ON CHIPPED STONE ASSEMBLAGES Experimental data indicate dramatically different interpretations of faunal and botanical assemblages resulting from the use of recovery strategies utilizing fine-screen mesh. It has been shown that the use of fine-screen mesh affects the recovery precision of archaeological materials, but the impact of fine-screen recovery on lithic technological interpretations has not been considered. It is important that lithic analyses reflect the proportional distribution of elements within a site. Assemblages obtained through 6-mm and 4-mm meshes do not reflect this distribution. Therefore, a sampling strategy utilizing 1-mm mesh should be employed in excavations utilizing larger meshes to obtain an assemblage from which valid inferences can be made. (38)

Hett, Charles E. S. (Canadian Conservation Institute) PLANNING A FROZEN SITE EXCAVATION: A CONSERVATOR'S VIEWPOINT This paper outlines the benefits of considering the conservation of artifacts before excavating frozen sites and the advantages of including an archaeological conservator at the stage of a preliminary survey before undertaking any sizable project at a frozen site. Planning for the provisions of adequate housing of recovered artifacts immediately upon arrival at their destination is shown to be a possible and essential part of their preparation for fieldwork. Some practical recommendations are made for the packing and labeling of organic materials in the field. (37)

Hett, Charles E. S. (see Janes, Robert R.) (37)

Hodder, Ian (Cambridge) REFUSE AND MODELS OF WITHIN-SITE SPATIAL PATTERNS Recent work on the patterning of artifacts within settlements has concentrated on the behavioral and activity factors that cause variation in such distributions. But refuse disposal can only be fully understood by reference to the mental structures that impose an order on the outside world. This is shown by ethnoarchaeological examples in Britain, Zambia, and Sudan, and the application of structural models to archaeological site data from the British Iron Age is demonstrated. (49)

Hoff, Ricky (Washington State) FISHING WITH REPLICATED WET SITE FISHHOOKS The wooden

fishhooks from the Hoko River wet site (45CA213) represent the oldest assemblage of perishable fishhooks found on the Northwest Coast. For a better understanding of the function of these fishhooks, experiments were conducted in their replication. Guided by Makah Indian elders, they were then used to fish for halibut and other bottom fish at traditional fishing beds. Consequently, through the use of archaeological and ethnological data, specifically the direct information gained from both the replications and the experience of Indian fishermen, a greater insight was achieved in the technological as well as the cultural aspects of these fishhooks. (37)

Hoffman, Michael P. (Arkansas-Fayetteville) CHANGING MORTUARY PATTERNS IN THE LITTLE RIVER REGION, ARKANSAS Mortuary variation between A. D. 800 and 1450 in the Little River region, Arkansas, based on a sample of over 200 burials and five archaeological phases, is documented and explained. It is postulated that the importance of individual sites in settlement hierarchies and social ranking of individuals account for much of the mortuary variation. By the Mineral Springs phase, the Caddoan culture possesses several attributes defined as archaeological correlates of chiefdoms by Peebles and Kus. The changes in Caddoan sociopolitical organization observed by Brown in the Arkansas River appear to be paralleled in the Little River region. (32)

Holley, Gerald A. (Washington) MICROWEAR: AN OBSERVATION OF SCALE Microwear studies are becoming a major method for the investigation of use-wear patterns on lithic artifacts. Major assumptions of many who use this method include (1) the utilization of smaller and smaller scales of observation allows for the observation of an increasing amount of information concerning use-wear, and (2) the greater evidence observed allows greater precision concerning spatial relationships between worn objects. A lithic assemblage was examined macroscopically and at varying microscopic levels in order to determine the validity of these assumptions. (42)

Holt, H. Barry (Texas-Austin) TROOP GARRISONS: THEIR EXISTENCE AND ROLE IN AZTEC MILITARY POLICY An examination of a variety of sixteenth-century documentary sources confirms the existence of numerous Aztec troop garrisons. Their locations can be pinpointed, and they can be classified according to their primary functions within the framework of Aztec military policy. Various *Relaciones Geograficas* also reveal the nature of local supply relationships between the garrisons and towns in their immediate vicinity. The nature of the *Codice Mendoza* garrisons will be discussed, in addition to the possible existence of an Aztec garrison near Xicalango-Cimatlan, Campeche. (46)

Holtzman, Richard C. (Minnesota Geological Survey) MAXIMUM LIKELIHOOD ESTIMATES OF RELATIVE ABUNDANCE IN VERTEBRATE FOSSIL ASSEMBLAGES The major methods of estimating the relative abundance of species in vertebrate fossil assemblages are maximum likelihood estimates. They differ from one another in their inherent assumptions about the assemblage and its relation to the sample being analyzed. Monte Carlo simulations suggest that in most cases estimates based on weighted abundance of elements provide greater accuracy than estimates based on minimum number of individuals. A consideration of these assumptions and quantitative errors pinpoints areas of needed research that could greatly improve the accuracy of relative abundance estimates as applied to fossil vertebrates. (25)

Hurley, William M. (Toronto) and Masakazu Yoshizaki (Hokkaido) RELATIONSHIPS BETWEEN THE YAGI AND HAMANASUNO SITE Two Early Jomon sites located on the Oshima Peninsula of Southwestern Hokkaido have been subjected to long-term salvage (Hamanasuno) and the beginning of a three-year research (Yagi) program. The two sites are 4 km distant from one another and are situated on similar terraces. Yagi is the earliest, dating from ca. 5000 to 4000 B. C., and Hamanasuno dates from 4100 to 3100 B. C. These two large Neolithic villages exhibit unexpectedly complex settlement patterns, ceramic continuity, and similar environmental adaptations in an area previously suggested as too severe for any pattern other than simple hunting and gathering communities. (36)

Hurst, David C. (see Nance, C. Roger) (29)

Inglis, Richard (see MacDonald, George F.) (43)

Jacobs, John D. (see Sabo, George) (44)

James, Steven R. (Utah) SEISMIC LINE SURVEYS: A POTENTIAL FOR RESEARCH The recent surge of oil and gas exploration on land administered by the federal government in the United States has necessitated short-term archaeological surveys of seismic testing activities. Surveys of seismic lines provide a sampling of various biotic communities in a narrow transect similar to linear transect techniques used in research-oriented surveys. Seismic line surveys in

southeastern central Utah illustrate the research potential of this type of survey. The sites recorded during the surveys indicate that the area was a focus for prehistoric quarrying activities. (4)

Janes, Robert R. (Prince of Wales Northern Heritage Centre), Brian Walker-Yorga (Toronto), Charles E. S. Hett (Canadian Conservation Institute), Martin Weaver (Department of Indian and Northern Affairs), and Robert Lemon (Carleton) **THE ARCHAEOLOGY AND CONSERVATION OF A FROZEN HISTORIC SITE IN THE CANADIAN HIGH ARCTIC** In 1853 a British naval search and rescue expedition constructed a stone storehouse off the coast of Melville Island, Northwest Territories, Canada. This storehouse was stocked with a complete inventory of provisions and supplies used in mid-19th-century Arctic exploration, many of which survive to this day in remarkable condition, because of the High Arctic climate. The history of the site and the interdisciplinary planning involved in its excavation and conservation are discussed. The archaeology is summarized, as are the various field conservation techniques used. Among the guidelines and conclusions offered is the essentiality of interdisciplinary planning and cooperation among archaeologists, conservators, and other specialists concerned with the archaeology of frozen sites. (37)

Jennings, Calvin H. (Colorado State) **PROTON MAGNETOMETER APPLICATIONS IN OPEN HUNTER-GATHERER SITES** Proton magnetometers have been employed with acceptable results in the survey of open campsites in Northwestern Colorado. The procedure requires the use of two sensing stations, which are triggered simultaneously. Data can be hand analyzed in the field. Automated data processing is recommended, however, because of the ease with which graphic aids to interpretation of anomaly signatures can be produced. The success of the application is in part the result of the low magnetic noise environment in which the surveys are made. (38)

Jewett, Roberta A. (Arizona State) **THE EFFECT OF DROUGHT ON PREHISTORIC AGRICULTURAL POPULATIONS IN THE SOUTHWEST: AN OVERVIEW** Arid regions are typically precarious environments for practicing agriculture. Modern preindustrial and ethnohistoric agricultural populations have varied in their perception of and adjustment to drought conditions. This variation is examined in an attempt to develop models for prehistoric agricultural adjustment to similar precarious environmental conditions. Principal components of the models are variation in perception due to drought duration and timing and differential labor allocation for agricultural pursuits, demographic factors, and environmental variation. (48)

Johnson, Jay K. (Mississippi) **POSTCLASSIC MAYA SITE STRUCTURE AT TOPOXTE, EL PETEN, GUATEMALA** Detailed contour maps of the second and third islands of Topoxte provide the data base for an examination of the use of space at a Postclassic ceremonial center in the Southern Maya Lowlands. Comparison with contemporaneous sites shows similarities in both architecture and site plan. Intrasite analysis is based on a series of metric variables that allow the formulation and testing of specific hypotheses about spatial organizations. Conclusions dealing with building function and social stratification are drawn from the analysis. (46)

Jones, A. Trinkle, and Richard W. Effland (Grand Canyon National Park) **A CLASSIFICATION OF PROJECTILE POINTS FROM THE SOUTHERN GRAND CANYON REGION** A recent archaeological reconnaissance of the Tusayan Ranger District of the Kaibab National Forest in northern Arizona produced a large number of projectile points. Attempts have been made to classify these points using groups with known Anasazi, Cohonina, and Archaic affiliations. The integrity of the groups with known association was initially tested using discriminant analysis. With proper group identity, artifacts that were found in isolation are classified using the discriminant functions. The final analysis focuses on the distributional patterns associated with the projectile points. (41)

Judge, W. James (National Park Service) **MINIMUM IMPACT SURVEY IN A MANAGEMENT CONTEXT** Modern archaeologists are faced with an inherent conflict between professional research demands on the one hand and managerial demands on the other. Professional research usually involves the destruction of at least some portion of the archaeological data base. Managerial demands emphasize, at least ideally, the conservation of that same data base. Whether all archaeologists feel this potential conflict equally at the moment is immaterial—it is indeed real and will not diminish with time. The concept of "minimal impact survey" provides an excellent opportunity to examine this conflict in some detail, to isolate some of the problems involved, and to suggest possible solutions. This paper attempts to do this by reviewing noncollective archaeological survey as a minimal impact technique and examining both its potential and its limitations from the empirical and theoretical standpoints. (17)

Jurgens, Christopher J. (Texas Tech) and Alston V. Thoms (Technology Research & Development) **SETTLEMENT PATTERN AND ENVIRONMENTAL ADAPTATION AT CHOKE CANYON RESERVOIR, TEXAS** Settlement and subsistence data derived from a 1977 intensive survey and testing

project in the Choke Canyon area of southern Texas provide the basis for this paper. Analyses indicate only slight changes in adaptation during a several-thousand-year period. Cultural materials are remarkably homogeneous throughout the reservoir area despite significant microenvironmental differences. Subsistence activities were centered on the exploitation of vegetal resources, which were supplemented primarily by terrestrial mammals and aquatic resources. Settlement patterns are explained using a model that incorporates seasonal availability of food resources and hydrological data. The paper also examines the cognitive processes underlying the model. (40)

Justen, Anne B. (Tulsa) **MICROWEAR PATTERNS ON BIFACES** The class "biface" includes considerable morphological and inferred functional variability. This microwear study was designed to address the problems of functional and morphological correlations in the class and to determine the point in the reduction sequence where bifaces came to be used as tools. A large number of bifaces from sites within the Hog Creek Valley, Central Texas, were selected for study using a Bausch and Lomb stereoscopic microscope with a precision microphotographic apparatus. A scheme for classification and interpretation of edge damage was devised, and the microwear attributes were subjected to computer manipulation. (41)

Kamilli, Diana C. (Colorado Museum) **APPLICATIONS OF PETROGRAPHY AND ELECTRON MICROPROBE ANALYSIS TO THE STUDY OF ANCIENT CERAMICS** Analyses of pastes and paints of ancient Mesopotamian Ubaid and related ceramics using polished thin section petrography, electron microprobe, X-ray diffraction, and SEM methods have identified site mineral assemblages, levels of technology, and in turn trade patterns, chronological development of ceramic methods, and technological communication by itinerant potters. Each of the many analytical methods now available can produce information, but no single technique can result in a complete picture. An understanding of the strengths and limitations of each method is necessary in devising the best combination for a specific problem. (22)

Kamp, Kathryn A. (University of Arizona) **ETHNICITY IN THE ARCHAEOLOGICAL RECORD** The archaeological methods currently utilized for delineating ethnic groups are discussed, and the literature on the subject is critically evaluated. Previous attempts to discern ethnic groups are deemed particularly inappropriate for the analysis of complex societies, because they make implicit or explicit assumptions about the predominance of home manufacture, the spatial contiguity of utilized areas, and the insignificance of intergroup variation in either wealth or subsistence/residence strategies. A new perspective, based on behaviors probabilistically associated with ethnic group membership, is described, and a research strategy that combines ethnoarchaeology, traditional archaeological analysis, and the examination of pertinent historic Near Eastern texts is presented. (38)

Kane, Allen E. (see Breternitz, David A.) (8)

Kaplan, Susan A. (Smithsonian) **NEO-ESKIMO OCCUPATIONS OF NORTHERN LABRADOR** The origin of the Eskimo communal house, found in Greenland and Labrador, has been discussed by Schledermann, Petersen, Taylor, and Jordan. Problems concerning the development of this house form will be addressed using ethnohistoric information and archaeological materials recently recovered from northern Labrador. Neo-Eskimo use of a variety of geographic regions and economic resources in northern Labrador will be examined using a settlement pattern approach, as well as analytical perspectives offered by modern ecological and biogeographical theory. (35)

Kent, Susan (Washington State) **THE USE AND REFUSE OF ACTIVITY AREAS: SPATIAL PATTERNING THROUGH TIME AND SPACE** Specific assumptions utilized by anthropologists concerning the use of space were assessed through ethnoarchaeological research. Navajo spatial patterning was observed and contrasted with reconstructions of recent Navajo archaeological sites. The influence of culture, socioeconomic status, and residence (rural versus urban) on spatial patterning was examined by reference to cross-cultural ethnographic data. Interesting results from the preliminary analysis suggest that many loci identified as work areas at archaeological sites may instead have been storage areas. In addition, the analysis revealed the important role dogs have in creating apparent activity areas. (12)

Kimberlin, Jerome (see Spence, Michael) (5)

King, Mary Elizabeth (University Museum, Pennsylvania) **CURATORS AND COLLECTIONS: ETHICS AND OBLIGATIONS** Although a curator's chief professional concern may be with his or her own research, the curator is, by definition, caretaker of the collections. The need for responsible management of museum collections and accompanying ethical standards has become obvious in recent years. It is significant that the membership of the American Association of

Museums made professional standards their first priority in a survey of future objectives. The curator of archaeological collections has potential ethical problems in a number of areas, including maintenance, acquisition and disposal, availability, disposition of human remains, and ownership and publication of scholarly material. (31)

King, Thomas J., Jr. (Bureau of Reclamation) A PARTIAL ARCHAEOLOGICAL SURVEY OF SAGUARO MONUMENT (EAST), ARIZONA An archaeological survey of 31 km of proposed horse trails in Saguaro National Monument (East), Arizona, has been completed for the National Park Service. The survey located 62 new archaeological sites. Two new Cochise culture sites, one AMI, two AMII sites, and numerous ceramic era sites were identified. Ceramics recorded ranged from an incised Snaketown red-on-gray, Pioneer period (A. D. 300-500) sherd to proto-historic Papago Red and Sobaipuri sherds. Ceramic data suggest the survey area was most heavily occupied in the Sedentary period (A. D. 900-1200). Lithic remains indicate notable quarrying, large flake production, and tool-making localities. Economic activities and three potential settlement pattern scenarios are discussed. (8)

Kirby, Foster E. (Tulsa) GASTROPOD EVIDENCE FOR LATE HOLOCENE ENVIRONMENTS IN THE SOUTHERN PLAINS Aquatic and terrestrial gastropods have been recovered in the thousands from archaeological sites in the Hog Creek Valley, central Texas. These were analyzed to species level with habitat extrapolated based on current collections. Detailed radiocarbon determinations have allowed a tight chronology to be developed with the change to more mesic conditions beginning about A. D. 600, when an increase in tree-cover density is hypothesized. Data from the northern section of the Southern Plains indicate that the shift in this area was toward more xeric conditions. Several synchronic climatic expressions are likely to have occurred throughout the Southern Plains. (50)

Klein, Richard G. (Chicago) DERIVATION AND INTERPRETATION OF AGE PROFILES FOR HYP-SODONT UNGULATES IN ARCHAEOLOGICAL FAUNAL SAMPLES The simplest and most economical method of establishing age profiles in osteological samples of hypsodont ungulates is probably the measurement of crown heights. In combination with demographic and behavioral data available on various extant ungulate species, crown-height-based age profiles of several species as represented in one European and two African Paleolithic sites suggest that the occupants of the sites generally stalked individuals of some species but regularly captured whole groups in others. In combination with knowledge of the relative abundance of various species in the sites and their probable relative abundance on the hoof, the age profiles also suggest that the particular hunters involved took very few individuals from the populations of large ungulates they hunted. (25)

Klesert, Anthony L. (see Powell, Shirley) (38)

Knight, George C. (Texas Tech) THE HISTORIOGRAPHY OF ANTHROPOLOGICAL ARCHAEOLOGY As the emergent archaeological paradigm of the 1960s, the New Archaeology caused significant changes in what had been a primarily historical discipline. Archaeologists began to look upon themselves increasingly as "scientists," consistent with the objectives of isolating variability in the archaeological record and attempting scientific explanation. Can we trace the spread of these ideas in the academic community? This paper attempts a content analysis of abstracts of papers delivered at the 1963, 1968, 1973, and 1978 meetings of the Society for American Archaeology. The results are placed in the framework of changing archaeological goals and their relevance to holistic anthropology. (19)

Knudson, Ruthann (see Goodsitt, Rochelle L.) (1)

Kohler, Timothy A. (see Schlanger, Sarah H.) (20)

Kosakowsky, Laura, J. and Rich Wilk (Arizona) SOME NEW METHODS FOR THE STUDY OF MAYA SITES Archaeologists in the Maya Area have tended to neglect the study of site formation processes. The Contextual Analysis Project at Cuella was intended to gather information that, combined with conventional stratigraphic analysis, can be used to better answer questions concerning the genesis and later disturbance of archaeological deposits. The densities and sizes of artifactual, floral, molluscan, and faunal remains were measured. In addition, artifacts were examined for degree of wear and abrasion. Some preliminary results from the analysis of these data are presented. (10)

Kraft, John C. (Delaware) GEOLOGICAL ANALYSIS OF COASTAL ARCHAEOLOGICAL SETTINGS The application of some basic geological techniques to the study of coastal change may be used to form paleogeographic reconstructions of archaeological sites. Throughout the Holocene

Epoch (past 10,000 years), ongoing geological change of coastal environments has greatly affected man's occupancy of the coastal zone. Paleogeographic studies are useful in interpreting the reasons for location of archaeological sites that now seem "out of place" with their present geography. (77)

Kraly, Karen Ann (Catholic) COMPUTERIZED MANAGEMENT OF ARCHAEOLOGICAL DATA BASES The quantity of relevant attributes recorded per artifact is increasing, indicating the need to computerize storage and retrieval of data. A systematic approach to data management is described, beginning with a design for field recording forms. This approach is illustrated with examples from the Mayan sites of El Mirador and Quirigua and from a North American site. (30)

Krotser, Paula H. (Universidad Veracruzana) PRODUCTION AND DISTRIBUTION OF SAN MARTIN ORANGE: AN EXAMPLE OF PREHISTORIC SPECIALIZATION AND DISTRIBUTION AT TEOTIHUACAN, MEXICO There is abundant evidence in the archaeological record for the production of San Martin Orange ware in a specialized ceramic workshop area and for its distribution through a market system. The evidence will be presented and discussed in terms of a general model for analysis of prehistoric pottery production. The usefulness of ethnographic parallels for recognizing specific modes of production will be considered. (5)

Kukan, Gerald J. (Toronto) PROGRESS AND VARIABILITY IN TOOL DESIGN DURING THE OLD WORLD PALEOLITHIC The theory presented in this paper provides an understanding of certain aspects of formal variation in lithic artifacts. This theory explains how lithic tools or tool components were designed or structured to magnify human or hominid muscular force in task activities. Techniques of tool design are perceived to have become increasingly efficient during the Paleolithic. Technological "progress" is manifested in design innovations pertaining to miniaturization, standardization, improvement in prehensile surface design, and longevity of tools or tool components. (2)

Kus, Susan M. (Michigan) ARCHAEOLOGY AND SYMBOLIC PRODUCTION As a conceptual tool, the notion of "mode of production," which encompasses not only "forces of production" but also "relations of production," has salvaged things cultural from an impoverished material determinism. As a result the theoretical burden is now placed on the definition of the "relations of production." To consider the "relations of production" simply as social rules of production, distribution, and consumption of goods and information while ignoring their representational aspect within a cultural system of meaning perpetuates a layer-cake model of culture. It leaves "ideological" matters as superstructural residue, reflected in, though not critical to, the creation of the archaeological record. The ideational aspects of the "mode of production" are discussed in relation to their "visibility" in the archaeological record. (12)

Lamp, Frederick J. (Yale) SAHAGÚN RECONSTRUCTED: A LEGEND OF FIVE SUNS The *Historia general de las cosas de Nueva España* by Fray Bernardino de Sahagún strangely appears to present no "Legend of the Suns," so prominent in contemporary sources. This paper is concerned chiefly with Chapter 29 of Book X, where a history of Mexican migrations ostensibly is given. The structure of key passages suggests that the entire account was recited originally as a standard oral tradition in the form of dyadic verse. Through reconstruction of the account, a series of five eras emerges with time sequences, presiding deities, color symbolism, and cardinal orientation corresponding to other versions of the "Legend of the Suns." (46)

Lange, Frederick W. (Museo Nacional de Costa Rica) DAMMED TOURISTS IN COSTA RICA: CULTURAL RESOURCE MANAGEMENT IN A DEVELOPING NATION Cultural resource management in developing countries has some goals and problems in common with advanced nations. There are also significant differences. Using three specific examples from hydroelectric and tourist development projects, this paper examines initial attempts at cultural resource management in Costa Rica. The focus is on cross-cultural comprehension of the importance of cultural patrimones, funding, training of local personnel for research and management, and the impact of international monetary agencies as destructive forces in cultural preservation. (39)

Larson, Thomas K. (Wyoming) BONE PROJECTILE POINTS RECOVERED FROM THE FOLSOM LEVEL AT THE AGATE BASIN SITE Two bone projectile points from the Folsom level at the Agate Basin Site, 48NA201, are discussed. These artifacts were found in definite association with the Folsom component and were in close proximity to the carcasses of *Bison* killed at the site. The overall morphology of points as well as indicators of manufacture techniques are presented. These artifacts will then be compared with bone projectile points from earlier paleo-Indian components in North America. (41)

Latta, Martha A. (Scarborough College, Toronto) A CERAMIC PARADIGM: DECORATIVE MOTIFS IN THE ONTARIO IROQUOIS TRADITION Studies of Iroquoian ceramics have traditionally used

decorative attributes as primary indicators of chronological and social variables within the tradition. Attempts to systematize the notation of these attributes have been hampered by underlying theoretical inconsistencies influencing the communication of data and the comparability of analyses. This paper presents a paradigm based on the act of creating the motif rather than on the motif itself. By focusing on the sequential decision structure inherent in the production of a given motif, we may isolate levels of choices, mutually exclusive or inclusive attributes, and aspects of design modification that contributed to the creation of the finished decorative motif. (22)

Laughlin, William S. (see Reynolds, Georgeanne L.) (42)

Layhe, Robert (Southern Illinois, Carbondale) DEMOGRAPHIC AND SETTLEMENT CHANGE, BLACK MESA, NORTHEASTERN ARIZONA: A COMPUTER SIMULATION Population and settlement change are hypothesized to have been the result of a number of interacting variables, which include demographic, environmental, economic, and organizational factors. The effects of these variables are simulated to test a settlement model proposed by Hudson. These theoretical similar distributions are then tested against the observed distribution of habitation sites on Black Mesa to ascertain the goodness of fit between the model and data and to explain variation in the settlement system through time. (12)

Lee, Thomas A., Jr. (New World Archaeological Fnd.) THE LONG PATH TO EXTINCTION: COLONIAL COXOH MAYA OF CHIAPAS, MEXICO The Coxoh, a small group of Maya peoples who occupied the upper Rio Grijalva basin at the time of the Spanish Conquest, are now almost extinct. Their identification and study have been carried out by ethnohistorical, archaeological, linguistical, osteological, and ethnoarchaeological methods. The demise of this group can be traced directly to an acculturation process in three phases: Conquest, Suncretic, and Necrotic. This process is a direct consequence of the Coxoh conquest, subjugation, infection, and exploitation by the Spanish. (26)

Lemon, Robert (see Janes, Robert R.) (37)

Lerner, Shereen A. (Arizona State University) THE EFFECT OF NATURAL BOUNDARIES ON SETTLEMENT SYSTEMS AND INTERACTION This paper focuses on settlement patterns in the Clear Creek area of central Arizona. Settlements are found along drainages in similar vegetation zones. However they differ in architectural style and village layout. The postulated presence of two distinct cultural groups in the area, Mogollon to the east of Clear Creek Canyon and Sinagua to the west, may account for these observed differences. The role of natural boundaries in determining patterns of settlement and interaction between groups is investigated. Preliminary results indicate that the natural boundary imposed by Clear Creek Canyon is a major differentiating factor. (38)

Levy, Candace (see Saleeby, Becky) (40)

Lewenstein, Suzanne (Arizona State) PRODUCTION AT CERRO MAYA: USES OF CHIPPED STONE A study of nonagricultural production at Cerro Maya, a Preclassic site on the coast of Belize, analyzes chipped stone recovered from Preclassic house floors and contemporaneous exterior surfaces corresponding to "household clusters." Because Cerro Maya has been described by Freidel as a trading port, inspection of lithic tools and debris attempts to identify "tool kits" used in the manufacture of (1) wooden objects (which would include canoes important for coastal trade), (2) rough fibers (e.g., for ropes), and (3) possible exports, such as worked shell. The distribution of production at the site is examined for implications about social organization. (14)

Lewis Johnson, L. (Vassar) MANUFACTURING SEQUENCES VS. STONE TOOL USE: AN EVALUATION OF PROSPECTIVE SUCCESS IN PREHISTORIC INTERPRETATION Studies of stone tool manufacture and use have increased markedly in the last few years. An examination of the results of these studies indicates that the former enjoy a greater degree of success than the latter and that experimental manufacture has had considerably higher predictive value than experimental use. It is argued that this difference is due to the complexity of variables involved in relating experimental results to the archaeological record and that, therefore, use studies cannot, except under extraordinary conditions of preservation of archaeological materials, attain the surety of manufacturing studies. (42)

Lightfoot, Kent G. (Arizona State) MULTI-SITE COMMUNITIES IN THE PREHISTORIC SOUTHWEST: AN EXAMPLE FROM PINEDALE, ARIZONA This paper discusses a subsistence/settlement system that was a social response to resource uncertainty in the American Southwest, specifically, the socioeconomic relationships that existed between large and small habitation sites around Pinedale, Arizona, approximately A. D. 1000 to 1300. A subsistence/

settlement system composed of one large central site and several small outlying settlements is viewed as one response to local inconsistencies in the yields of domestic and wild resources. To evaluate whether a cluster of large/small sites functioned as a subsistence/settlement system, a design analysis on black-on-white ceramics is undertaken. (21)

Lightfoot, Kent G. (see Hantman, Jeffrey L.) (14)

Liman, Florence F. (St. Louis) A MAYA BALL GAME VASE A polychrome Maya vase in the St. Louis Art Museum is one of the few depicting the playing of the ball game. Stylistically it is not related to any vase of comparable subject matter, but to one concerned with a scene of human sacrifice. The correspondences indicate that both were done by the same artist or workshop, although the provenance of one is given as Belize and of the other as Bonampak. This paper will consider the pictorial decoration, the glyphic inscriptions, and the ceramic pots themselves as evidence for this conclusion. (22)

Limp, W. Frederick (F.I.A.) RESOURCES AND RATIONALITY: ECOLOGICAL AND ECONOMIC ANALOGUES A basic anthropological question is the nature of the articulation between biophysical and cultural systems. Of particular interest are the specific processes involved in the relationships between resource distributions and the location of prehistoric activities. An examination of these relationships is conducted using an axiomatic choice theory framework. The basic characteristics of axiomatic choice theory are discussed along with a computer-based operationalization of the theory. The results of application of the theory and method to prehistoric activity distributions in a portion of the Ohio River Valley are discussed. (21)

Lincoln, Charles Edward (Tulane) THE STRUCTURE OF MAYOID SOCIETY, BASED ON EXCAVATIONS AT TRAVESIA. Recent excavations at Travesia in Honduras explored the architecture of the site. The results are described and compared with other Ulua-Yojoa sites. It is suggested that Travesia was the central integration point for a large sociopolitical and economic unit that encompassed the entire Ulua-Yojoa culture area. This suggestion is evaluated and examined in light of presently available data about the Ulua-Yojoa or "Mayoid" culture. Architectural evidence is used as the primary basis for comparison and inference. (46)

Lindsay, Alexander J. (Museum of Northern Arizona) and Glenna Williams-Dean (Boston) AN EVALUATION OF ARCHAEOLOGICAL COLLECTIONS MANAGEMENT PRACTICES In 1978 an American Anthropological Association project assessed the present state of curation of federally owned archaeological collections. Federal laws, regulations, and collection management objectives were reviewed, and a field study was made of 20 institutions to assess curation practices and the physical state of the archaeological collections. Recommendations and guideline statements to assist in the achievement of adequate curation of archaeological data have been proposed and will be discussed. (31)

Lipe, William D. (see Schlanger, Sarah H.) (20)

Lobdell, John (see Workman, William B.) (44)

Longacre, William A. (Arizona) KALINGA POTTERY, AN ETHNOARCHAEOLOGICAL STUDY Assumed sources of stylistic variability in pottery have been used by archaeologists to make inferences about the organization and behavior of extinct societies. To assess the validity of these assumptions, 12 months of fieldwork were conducted among the Kalinga of northern Luzon, Philippines. Kinship and learning frameworks among the potters and participation in work groups were studied, and a collection of nearly 300 vessels from a controlled sample of potters was made. Stylistic variation in Kalinga pottery is more complex than expected. It is related not only to the learning frameworks but also to work group participation and season of production. (22)

Lorenz, Thomas H. (Washington) TURNER OVERLOOK FAUNA An arctic fauna collected during July 1978 by archaeologists from the Alaskan Fish and Wildlife Service is characterized and examined by SPSS and SYMAP techniques. This Eskimo caribou harvest locality was apparently occupied seasonally during the middle of the last century. Technologically, the fauna belays the impact of metal blades on animal processing. Graphic mapping of spatial characteristics of the fauna yields a predictive model that can be tested through further investigation. Excellent bone preservation helps track the spatial relationships linking cultural artifacts and fauna. (44)

Lubensky, Earl H. and William R. Fowler, Jr. (Missouri Archaeological Society) POSTCLASSIC CEREMONIAL STRUCTURES OF CENTRAL EL SALVADOR Excavations of ceremonial structures, mainly at the postclassic site of Cihuatlan in central El Salvador, are discussed, with special emphasis on indications of sudden departure of the inhabitants from the sites. Smashed incense burners at the base of the Western steps of the structures, apparent purposeful place-

ment of obsidian blade fragments near the incense burners, and burnt remains of structural materials, especially wattle and daub, all in a matrix of a probable volcanic ash deposit, tell a story of catastrophe. Speculation allows a vision of ritual "desanctification" of the religious structures at the sites upon forced abandonment. (27)

MacDonald, George F. and Richard Inglis (Archaeological Survey of Canada) CHANGE AND CONTINUITY IN NORTH COAST, BRITISH COLUMBIA, WOODWORKING: A THREE THOUSAND YEAR PERSPECTIVE The development of woodworking on the North Coast of British Columbia, the historic territory of the Tsimshian and Haida people, is studied through the analysis of carving tools and/or wooden artifacts from three time horizons: the prehistoric period between 3000 B. C. and A. D. 1800, the contact period, and the late historic period. The implications for the time span of the development of the Northern Style and "crest art" are seen to parallel the development of ranking in northern Northwest Coast societies. The influx of Europeans during the contact period intensified but did not alter the basic pattern. (43)

MacDonald, John (Oregon) and Richard Yerkes (Environment Consultants) THE LARGE MAMMAL REMAINS FROM THE CLAH-CLEL-LAH SITE (45-SA-11), NORTH BONNEVILLE, WASHINGTON The analysis of the remains of large mammals from 45-SA-11 provides data useful for understanding the utilization of different areas of the site at different times of the year and in monitoring changes in the cultural patterns of the aboriginal population who were in contact with Anglo-Americans. The numbers of individuals of each species, the size, age, and sex of these individuals, and the parts of the bodies used for food, tools, or shelter provide insights into the exploitation of the fauna and the methods of animal butchering and processing. (3)

MacNeish, Richard S. (Peabody Foundation for Archaeology) SUMMARY OF AYACUCHO INTERDISCIPLINARY STUDIES The paper will concern the coordination of the many interdisciplinary studies that have been undertaken in the Ayacucho Valley and the investigations from 1969 to 1974. It will also summarize our plans for future publications—all six volumes—as well as further programs of research. A brief summary of the sequence, the dates, the geological findings, and the cultural implications of the preceramic will also be given. (7)

MacNeish, Richard S. (Peabody) WPA ARCHAEOLOGY—THE GREENING OF AMERICAN ARCHAEOLOGY? A brief survey of the states in which WPA archaeology was conducted will be given, as well as a listing of some of the archaeologists who received training in these various projects. Mention will be made of some of the monographs that resulted from these endeavors, and there will be a discussion of some of the new breakthroughs in techniques and methods that occurred, as well as a criticism of some of the faults of the researches. (19)

Marcotte, James R. (Colorado State) MANUFACTURING AND USE WEAR PATTERNS WITHIN A SINGLE PROJECTILE POINT TYPE Within a single projectile point type, variations in morphological attributes, edge wear, and fracture patterns are shown to represent various sequential manufacturing stages and differential use. A sample of over 70 specimens from a single Archaic component of the Porcupine Peak Site in central Colorado (elevation 3,000 m) provides a unique opportunity for analysis. A five-stage manufacturing model best explains artifact groups recovered from the site. Behavioral implications are discussed in view of these patterns. (41)

Marquardt, William H. (Missouri-Columbia) and Patty Jo Watson (Washington-St. Louis) SHELL MIDDEN FORMATION AND DEFORMATION: A CASE STUDY The Green River shell middens, long important to interpretations of eastern U.S. prehistory, have yielded cucurbits dating to 2500 B.C. in an otherwise "forest efficiency" subsistence context. However, the depositional processes responsible for the formation of these and similar sites are not well understood. Explanations of changes in Archaic subsistence at this important time period necessitate a detailed understanding of relevant physical and cultural site formation factors. A project combining geological, paleoecological, and archaeological perspectives is described, and the contributions, both substantive and methodological, of the succeeding four symposium papers are explained. (16)

Marquardt, William H. (Missouri-Columbia) SHELL MIDDEN FORMATION PROCESSES: IMPLICATIONS FOR THE GREEN RIVER ARCHAIC The previous papers (in this symposium) have reported the results of detailed archaeological, paleoecological, and geological research intended to contribute to the understanding of shell midden formation and deformation processes. Advances in our understanding of the sites, coupled with data previously gathered in western Kentucky by project members and other colleagues, are summarized and brought to bear on these related hypotheses: (1) the context of the oldest cultigens in the shell middens is a "forest efficiency" subsistence pattern; (2) as suggested by Caldwell, the impact of the cultigens on subsistence was very slight because the forest environment was rich in wild food resources. (16)

Marshall, Alan G. (Lewis-Clark) THE SOCIOECONOMIC BASES OF NEZ PERCE SETTLEMENT AND SETTLEMENT PATTERN Economic inferences about southern "American" plateau archaeological sites suffer from the lack of an adequate ethnographic model of settlement and settlement pattern. The dispersal of individuals in early-19th-century Nez Perce settlements was largely governed by kinship and tenure. Nez Percés recognized two kinds of settlements: winter villages and established camps. The locations, distribution, and internal structure of the habitations reveal major economic parameters. (32)

Marshall, Sydne B. (Columbia) THE LAND MANAGER AND THE ARCHAEOLOGY LAB The context of a land managing agency often places demands on the agency archaeologist that differ from those of the academic researcher. Laboratory facilities in the traditional sense of places for artifact processing and curation are not often included within the scope of a public agency's responsibilities. The agency archaeologist must plan cultural resources management projects in accordance with agency goals, available facilities, and public responsibility. (30)

Maslowski, Robert F. (Corps of Engineers) MOOREHEAD CAVE: AN EXAMPLE OF COAHUILTECAN CONTINUITY IN TRANS-PECOS TEXAS Moorehead Cave is a typical rockshelter occupation in the Amistad area of Trans-Pecos Texas. The Amistad archaeological assemblages represent cultural stability for thousand of years. While projectile point styles change, the basic basketry, sandal, and cordage technologies persist, indicating a continuity in cultural populations. Review of the historical, ethnographic, and linguistic data for southern Texas suggests the Amistad area was occupied by Coahuiltecan bands. Several decorated pebbles from Moorehead Cave represent anthropomorphic figures with motifs similar to tattoos and/or body paintings recorded for historic Coahuiltecan bands. (32)

Mathews, William GLACIAL CONDITIONS LIMITING HUMAN HABITATION ON THE NORTHWEST COAST During the period 29,000 to about 21,000 B.P. on the C.C. coast, ice tongues from the higher mountains reached down to sea level (e.g., Strait of Georgia). These ice tongues and the associated adverse climate contributed to a hostile environment for human migration and occupation. During the period 21,000-13,000 B. P. (apart from a short interlude about 18,000 B. P.), glaciers overwhelmed most of the lowland areas, and occupation was possibly precluded. From 13,000 to 11,000 B. P., the climate was ameliorating, and glaciers were withdrawing. The two periods of high relative sea level would have barred human occupation of many of the lowland sites. From 10,000 to 5,500 B. P. relative sea level was somewhat lower on the B. C. coast than at present, and shoreline sites then occupied may subsequently have been destroyed by the later rise of the sea. In Washington State the glaciers at their maximum were much less extensive than in B. C., but the fluctuations in climate and associated changes in vegetation may for a time have rendered occupation difficult. (34)

Matson, R. G. (see Washburn, Dorothy K.) (22)

Matthews, Meredith H. (Colorado) THE CEREN SURVEY AND TEST EXCAVATIONS AT C-2 Concurrent with the excavations at the Ceren site, a cruciform transect survey was completed, using the Ceren site as the focal point of the survey area. The major objectives of the survey were settlement patterns, chronology, and site function within the localized survey area. A brief testing program was conducted at one of the three sites recorded in the survey area (C-2), located approximately 1.35 km SSW of the Ceren site. Test excavations at C-2 were conducted to establish the chronological position of the site within a generalized regional culture period and within a relative position to the Ceren site. Inherent in the objectives of the survey and testing program was the establishment of a spatial and temporal context within which the Ceren site could be placed, to avoid evaluating the site in a cultural vacuum. (11)

Maxwell, Moreau S. (Michigan State) SITE VARIATION ON SOUTHEASTERN BAFFIN ISLAND Many Dorset sites on the south coast of Baffin Island, though occupied over long periods of time, have produced few indications of residence structures. The paper will discuss the evidence that does exist in its geographic and ecological setting, correlate it with faunal and artifactual remains, and compare it with Dorset information from other locales. In this context changes in settlement systems, in site utilization, in hunting practices, and in population concentrations through time will be interpreted and discussed. (44)

May, J. Alan (Missouri-Columbia) SHELL MIDDEN FORMATION PROCESSES: METHODOLOGICAL PERSPECTIVE Anthropological descriptions of shell middens are known from many parts of the world. These shell accumulations are thought to result from a subsistence pattern characterized by seasonal occupations of hunting/gathering groups. Certain shell middens in western Kentucky may aid in the understanding of cultural and noncultural mechanisms of midden accumulation and erosion. Approaches utilized to study these mechanisms include (1) WPA excavation records, (2) soil augering, (3) water erosion of profiles, (4) horizontal mapping of

shell orientation. These data have been used to construct and evaluate explicit models of midden formation. Results from the 1978 season are illustrated, and specific and general conclusions are presented. (16)

Mayer-Oakes, William J. (Texas Tech) **CONCEPTS OF THEORY IN OPERATIONAL ARCHAEOLOGY** The theoretical framework for an operational approach to archaeology is based on the explicit statement of "objectives" and appropriate "operations" in all stages—background, planning, implementation—of a total archaeological research process design. These paired "core" concepts are used at the levels of theory, where problems are stated, of method, where projects are designed, and of technique, where tasks are listed. This "OB-OP Hierarchy" is the theoretical nucleus of our approach. Attention is given to the differences between activities as planned and as actually done, and the effects these differences can have on research results. It is noted that information about such differences and details of operations are rarely given in archaeological research reports. (39)

Mayer-Oakes, William J. (see Portnoy, Alice W.) (39)

Mayo, Daniel R. (see Morris, Elizabeth Ann) (41)

McCartney, Allen P. (Arkansas) **THULE PREHISTORY AT SOUTHERN SOMERSET ISLAND: A CULTURAL SUMMARY FROM THE CENTRAL CANADIAN ARCHIPELAGO** Archaeological survey, excavations, and whale bone studies between 1975 and 1978 are reviewed. Southern Somerset Island is an area of high marine productivity, and the prehistoric bowhead whale fishery is one of the richest known for the central Arctic. Early Thule whale hunters living here had indirect trade ties with both the eastern and western Arctic as well as local technological adaptations. Eight winter house sites provide comparative evidence for settlement patterns, house construction, and whale exploitation; two of the sites have recently been excavated for artifact and refuse samples. (44)

McCawley, J. C. and D. W. Grattan (Canadian Conservation Institute) **THE POTENTIAL OF THE CANADIAN WINTER CLIMATE FOR THE FREEZE DRYING OF DEGRADED WATERLOGGED WOOD** Over the past two Canadian winters, the possibility of using winter conditions to freeze-dry water-logged wood has been studied. The results of the first year's work, showing the promise of the process, will be briefly summarized. The second year's study shows the effects of freezing rate and temperature, pretreatment, geographical location, shelter design, and posttreatment care, as well as the implications for future use with large timbers. (37)

McDonough, J. (see Ammerman, A.) (49)

McMillan, Barbara A. (Dartmouth) **THE INTERPLAY OF ARCHAEOLOGIST AND CONSERVATOR** More archaeologists need to consult trained conservators, experts in material technology and the conservation of artifacts, in order to preserve excavated data. The conservator should be utilized not only on historic sites but on any sites that yield vulnerable, perishable materials. For anthropological purposes this professional can stabilize materials without wiping away clues to past cultural significance and can interpret these clues for the archaeologist. The conservator should be an integral part of the setting up and processing of materials in the lab, be called upon for emergency field situations, and advise on the proper storage and display of materials. (30)

McPherron, Alan (Pittsburgh) **THE INTELLECTUAL MILIEU OF THE DEVELOPMENT OF ARCHAEOLOGY** To what extent has archaeology developed in isolation of developments in other disciplines? Most treatments of the history of archaeology do not devote much attention to the contemporary trends in thinking, apart from the interdependence of archaeology and geology in Britain and France or archaeology and ethnology in the U. S. in the early days. In fact, archaeology developed into a science in a milieu of intellectual activity that also involved the social and earth sciences. The mutual interplay is examined through citation analysis of journals dealing with archaeology, history, geology, and geography. The light that such work throws on the history of archaeology is discussed. (19)

Metcalfe, Michael D. and Patricia A. Treat (Powers Elevation) **CONTINUITY IN LATE PREHISTORIC PERIOD PRONGHORN PROCUREMENT IN SOUTHWESTERN WYOMING** Recently discovered sites in southwestern Wyoming have added substantially to the catalogue of faunas indicative of prehistoric pronghorn (*Antilocapra americana*) utilization. Bone and projectile point assemblages from camp and butchering sites indicate a continuity in pronghorn use throughout the Late Prehistoric Period. Radiocarbon dates ranging from about A.D. 600 to 1700 support this conclusion. Similarities in butchering patterns are noted throughout the time period. Intermountain tradition ceramics first appear in assemblages about A. D. 1100. Evaluation of the role of prong-

horn in Late Period subsistence strategies rests on ethnographic analogy, functional associations of tool assemblages, seasonality of kill events, and comparative material from other contemporary sites. (41)

Miksicek, Charles (Arizona) **LOWLAND MAYA AGRICULTURE—THE ARCHAEOBOTANICAL EVIDENCE FROM NORTHERN BELIZE.** Archaeobotanists working in wet, tropical regions have always been plagued by the problem of poor organic preservation. In order to recover carbonized plant remains too small to be seen in excavations, water flotation was tested in the 1978 field season at the Cuello site in northern Belize. The experiment proved successful in recovering evidence of maize, yam, and cocoyam cultivation dating to the later third millennium B. C. The samples also produced cohune nuts, wild gourd rinds, and over 30 kinds of identifiable wood charcoal. (10)

Miller, Glenda F. (Catholic) **FIELD RECOVERY AND PRESERVATION** Archaeological specimens are in continuous, systemic interaction with their environment, which includes each other. Accurate assessment and treatment of specimens in the field can make the difference between preserving the specimen and its information or not. Treatment depends upon the composition of the material recovered and the conditions of soil, air, and water under which it has existed. Field preservation techniques for materials such as wood, bone, various metals, fibers, hides, and other organic residue will be discussed with respect to such factors as soil pH, presence of chemicals, exposure to air and water, and temperature. (30)

Miller, Mark E. (Colorado) **PREHISTORIC SITE LOCATIONS IN NORTH PARK, JACKSON COUNTY, COLORADO** Over 150 prehistoric sites recorded during a surface survey of Jackson County, Colorado, are analyzed in an effort to recognize settlement patterns. These sites are subjected to both chronological and functional classifications. Several environmental variables are considered as factors potentially influencing site locations, and these variables are used to suggest (1) change in settlement pattern through time and (2) the influence of site function upon the selection of a site location in a particular environmental setting. (41)

Miller, Mary Ellen (Yale) **CENTRAL MEXICAN MYTH IN THE POPOL VUH** Careful study of the Popol Vuh reveals an important similarity to contemporary sources from Central Mexico in its presentation of the legend of the suns and the myth of serial creations of the world. Reconstruction of this legend in the Popol Vuh may shed new light on the Mexican texts and also help us to understand the history of contact between highland Guatemala and central Mexico. (46)

Minnerly, W. Lee (Michigan State) **LA SAULT DE SAINTE MARIE: A STUDY OF SPATIAL DYNAMICS ON AN URBAN FRONTIER** Successful application of a frontier model to historic site data and methodological developments in town plan analysis suggest new directions of inquiry into the sociological implications of recent settlement. At the level of individual sites, functional components of the frontier model and their relationship to site structure may be isolated and usefully employed to better understand postcolonial community settlement patterns, both through a reworking of the model to enhance its applicability to early national contexts and through consideration of settlement morphology from perspectives developed by urban geographers. (32)

Minnis, Paul E. (Michigan) **AN ARCHAEOLOGICAL PERSPECTIVE ON FOOD STRESS** Increasing archaeological interest has focused on the role of food stress in cultural dynamics. This is particularly true for research in the American Southwest. Generally, food stress has been considered as acute, episodic events—famines. This paper broadens the definition of food stress and considers how food shortages relate to food stress and how food stress is related to cultural system change. The concept of famines is enlarged to a perspective on food consumption variation. Archaeological and ethnographic examples are provided to illustrate the points raised here. (48)

Minor, Rick (Oregon) **SITE DESTRUCTION OR SURVIVAL: LIMITING FACTORS IN INTERPRETING LOWER COLUMBIA PREHISTORY** The destruction or survival of archaeological resources is an important limiting factor in attempts to learn about the past. Yet the "completeness" of the archaeological record is a subject rarely considered in most regional studies. The importance of this variable is most acute in studies involving river systems, as riverine environments are extremely susceptible to alteration as a result of both natural and man-related causes. Focusing on the situation in the Lower Columbia River region, this paper discusses the effects of the factors of site destruction or survival on current efforts to understand the prehistory of the region. (3)

Monks, Gregory G. (Manitoba) **THE PROCUREMENT SYSTEM CONCEPT: MODIFICATIONS AND OPERATIONALIZATION** The procurement system concept of Flannery (1972) is reviewed. Issue is taken with the application of the term "system" to archaeological data, designation of the food

resource as the only focus of a procurement system, lumping "annual round" and "division of labor" under "scheduling," and the a priori assumption of specific relationships between cultural and environmental variables. "Procurement complexes" are proposed as the archaeological indicators of procurement systems. Quantitative techniques, ethnographic analogs, and ecological analogs are used to detect procurement complexes in a Northwest Coast site. The inference of procurement systems from procurement complexes is discussed. (40)

Moore, James A. (Massachusetts-Amherst) and Green, Stan (South Carolina) "DRIVE, HE SAID": EVALUATING MODELS OF AGRICULTURAL EXPANSION Simulation techniques allow the evaluation of the conceptual foundation of theories without the methodological complexity and logical clutter that creep in during the examination of a general cultural process in a specific culture historic context. The swidden clearance of temperate forests and the impact of agricultural settlements on hunter-gatherer locational costs are examined in two conceptual computer simulations. All other things being equal, these simulations have identified two processes that provide the internal dynamics for expansion along the agricultural frontier. (20)

Moore, James A. (Massachusetts) TERMINAL ARCHEOLOGY: THE USE OF COMPUTER SIMULATION IN THEORY BUILDING Optimality models have generated a series of insights into the variables that may structure subsistence and settlement behavior. However, one basic assumption of optimality models for subsistence and settlement is the condition of perfect knowledge among the decision makers. This is a simplifying assumption we know to be false. Given the violation of a basic assumption, how robust is the theory? Simulations of several experimental information-sharing networks result in a divergence from the predicted optimal settlement patterns. This case shows how simulation can efficiently and elegantly reveal the strengths, limits, and blind spots of our theories. (2)

Moreau, Jean-Francois (Montreal) THE "INLAND" OCCUPATION ON THE PACIFIC COAST OF PREHISTORIC NORTHWESTERN COSTA RICA Previous reports on a small noncoastal shell midden in Guanacaste Province, Costa Rica, dealt with the marine mollusca remains and evidence for seasonal occupation of the site that could be inferred from their analysis. The present report presents the ceramic, lithic, and faunal data from the site, which offers a particularly good analytical sample because it was slightly more than 50% completely excavated. Noncoastal shell middens are an important settlement aspect of the Late Polychrome (A.D. 1200 to 1520) period in Pacific coastal Costa Rica. (28)

Morehead, James R. (see Guderjan, Thomas H.) (12)

Morgan, James D. (see Bianchi, T. H.) (39)

Morlan, Richard E. (National Museum of Man, Ottawa) UPPER PLEISTOCENE ARCHAEOLOGY, PALEONTOLOGY, AND STRATIGRAPHY IN NORTHERN YUKON TERRITORY The earliest known evidence of human occupation in eastern Beringia can be evaluated in a stratigraphic and paleoenvironmental framework spanning more than 100,000 years and in the light of experimental replications of a distinctive technology based in part on the percussion flaking of bone. Radiocarbon dating supports the hypothesis that human populations entered Beringia before 50,000 years ago, and this early age implies that fully modern man may not yet have emerged in western Eurasia when the initial peopling of the New World took place. The East Asian mainland appears increasingly likely as the area of origin for the first Beringians. (45)

Morris, Craig (American Museum of Natural History) ECONOMIC GROWTH AND POLITICAL STRATEGIES Archaeological and ethnohistorical evidence demonstrates that the Inca state was directly involved in the management of nonagricultural production. The Inca case will be used to examine several questions regarding the relationships between the production of goods such as cloth and socioeconomic and political growth. Political aspects of the demand for nonsubsistence goods will be explored, as will the organizational forms such production took and the consequences of increasing production in further socioeconomic change. (14)

Morris, Elizabeth Ann and Daniel R. Mayo (Colorado State) CURRENT RESEARCH AT THE LIGHTNING HILL SITE (5-LR-284), NORTH-CENTRAL COLORADO Continuing excavations by the Colorado State field school produced additional information about Early Ceramic period occupation in the Plains-Rocky Mountain ecotone. Cord-marked ceramics and Hogback projectile points in association with several hearth styles overlie scattered Late and Middle Archaic remains. Eight radiocarbon dates from the former range from A.D. 180 ± 115 to A.D. 1160 ± 120. One date from an Archaic hearth is 3440 ± 165 B.C. (UGa-1388). Notable is a large slab-lined Hogback age hearth packed with charcoal and fragmented burned bone. Investigation of this feature, faunal analysis, and the potential for archaeomagnetic dating will be the foci of 1979 research. (41)

Most, Rachel (see Cable, John S.) (42)

Munday, Frederick C. (Montana) OLD SCHEMES AND NEW DIRECTIONS: A CONSIDERATION OF THE USEFULNESS OF BORDES' MOUSTERIAN CLASSIFICATION SYSTEM While Bordes' classification system for the Mousterian marked a major advance in systematized Paleolithic studies, the behavioral basis for many of the indices used remains unknown but is assumed to have a "cultural" basis. The requirements for using and applying Bordes' system are evaluated for the Levantine-Mousterian and found wanting. The determinants of a number of Bordes indices are evaluated using data from a small area in southern Israel where we have some control over in-trasite variability, resource availability, curation, and occupation duration at sites. We conclude that Bordes' system can be dropped without harm to Mousterian studies. (23)

Muto, Guy R. (Oklahoma) EDGE DAMAGE: THE OTHER POSSIBLE CAUSES Edge damage to lithic artifacts has been used to infer prehistoric use, behavior patterns, manufacturing techniques, and function. Within this frame it has been apparently productive and opened new doors in archaeological analysis and interpretation. However, edge damage is not always the product of human behavior, nor is it always the product of prehistoric human behavior. Two other possible causes need to be examined; natural agencies, such as pedoturbation, and recovery/post recovery damage including screen wear, shovel retouch, and sorting spalls. Results of observations and experiments are presented that point out the problem, and a model is developed to initiate the process of factoring out the other possible causes of edge damage to lithic implements. (42)

Nance, C. Roger and David C. Hurst (Alabama-Birmingham) STATISTICAL ANALYSIS OF LITHIC MATERIALS FROM THE O'NEAL SITE, JEFFERSON COUNTY, ALABAMA This Late Archaic-Woodland site is extensive, shallow, and plowed. Intensive analysis of 6,000 flakes and spalls from 42 of 143 squares revealed vertical shifts in flake size, materials, and morphology. The same attribute covariation occurred horizontally (square by square). A factor analysis based on vertical trends scaled the 42 squares in relative sequence. Factor scores correlated with square flake frequencies and were assigned to remaining squares using linear regression. Mean artifact factor scores were compared for selected groups using the *t* test. Trends in artifact size and morphology are compatible with the flake sequence. (29)

Nance, Jack D. (Simon Fraser) MODELS FOR THE MEAGER: SMALL SITES ARCHAEOLOGY, CULTURAL FORMATION AND STOCHASTIC PROCESS Recent interest in processual and behavioral archaeology has stimulated inquiry into the processes responsible for the observed configuration of the archaeological record. Stochastic process models are utilized in an attempt to identify those variables that may influence rates of artifact deposition in and among small, shallow prehistoric campsites. Simulations provide insights into the possible effects of variation in site population, length of occupation, site function, artifact curation, loss, and discard on deposition of individual item classes, total item deposition, and assemblage diversity. (12)

Nelson, Ben A. (Southern Illinois) INFORMATION YIELD FROM VESSEL RECONSTRUCTION: VOLUME, FORM, FUNCTION AND CONTEXT As part of a socioeconomic analysis of a late pueblo population, intensive efforts at vessel reconstruction have greatly facilitated the study of certain properties of the archaeological record. Analysis of the reconstructed vessels resulted in increased reliability of generalizations about depositional processes, form-function associations, and minutiae of stylistic variability useful for chronological control. In addition, important feedback was generated for use in studies of other samples from the same ceramic population, e.g., equations capable of predicting vessel volume from rim sherds or other small vessel fragments. (22)

Nemeric, Juan C. (SUNY-Binghamton) CERAMICS AND TRADE: PROBLEMS IN MIDDLE RANGE THEORY The emphasis of this study is on the benefits and overall explanatory power of the theory of MRT, rather than on explanations of single occurrence as implied by the use of the nomological-deductive method. The application of the concept of MRT is demonstrated in reference to a sample of ceramic wares from Huari, Peru. From this application a number of new hypotheses and explanations about the mechanics and structure of trade networks are derived. (22)

Neuman, R. W. (Louisiana State) WETLAND ARCHAEOLOGY IN THE LOUISIANA COASTAL ZONE Because of its historical development as one of the world's greatest deltaic regions, the Louisiana coast has influenced the course of human settlement for the last 10,000 years. The prehistoric and historic occupants of the region have selectively exploited various natural formations as places for settlement. Industrialization, population expansion, and natural phenomena have taken a heavy toll on archaeological sites, but recent legislation has provided means



whereby they may be protected and managed. The applicability and problems of aerial photographic techniques employing conventional methods and NASA imagery will be discussed, as will the problems of logistics and below sea level excavations in the marshlands. (37)

Neusius, Sarah W. (Northwestern) **FAUNAL REMAINS, FLOTATION AND SAMPLING AT KOSTER: METHODOLOGICAL IMPLICATIONS** Since modern archaeological excavation includes thorough recovery of faunal remains, efficiency in analysis should become a central concern of the archaeozoologist. At Koster, flotation samples from the Middle Archaic horizons alone contain over two million pieces of bone and shell. The sampling strategy developed for these materials has important implications for archaeozoological method. First, it indicates that efficiency involves not only a reduction in the number of pieces examined but also an awareness of the number and nature of attributes that need to be recorded. Second, at Koster important information is being gained from sample attributes other than species composition. (15)

Nichols, Deborah (Penn State) **PREHISPANIC IRRIGATION AGRICULTURE AND SETTLEMENT PATTERNS IN THE BASIN OF MEXICO: A TEST CASE** A major theoretical controversy in Mesoamerican archaeology concerns the role of hydraulic agriculture in the evolution of settlement systems in the Basin of Mexico. Evaluation of this hypothesis has been difficult because of lack of archaeological data on pre-Hispanic irrigation, but preliminary results of a research project, *Settlement Survey in the Basin of Mexico: New Methodological Procedures* (1977), indicate that such subsurface remains can be detected with infrared aerial photography. Investigation of a subvalley of the Guadalupe Range has provided new data on pre-Hispanic irrigation and its inception during the Middle Formative. These data are discussed in relation to the evolutionary history of the local settlement system, which reflects wider processes of change in the pre-Hispanic settlement systems of the Basin of Mexico through the Aztec period. (9)

Nichols, Jacqueline (New Mexico) **THE DEMANDS OF AN EFFICIENT ARCHAEOLOGICAL FIELD LAB** The archaeological field lab is no longer a laundry for washing/marketing artifacts, nor is it a holding station for temporary processing/conservation. Today's research projects are frequently long-term, regionally wide ranging, or both, demanding an efficient locus of information processing, immediate analysis, and routine field testing. The ability to organize and maintain such a locus requires skills equal to that of field director. It is proposed, therefore, that the status of lab director should be upgraded. Further, such a lab will, of necessity, make demands on fieldwork. This interaction will have positive effects on the research. (30)

Nickens, Paul R. (Centuries Research) **REGIONAL RESEARCH DESIGN DEVELOPMENT IN CULTURAL RESOURCE MANAGEMENT: PROBLEMS AND PROSPECTS** The usefulness of effective regional research designs to the archaeological profession and federal agencies concerned with the management of cultural resources is considered in this paper. The development of such designs from large-scale contracts dealing with cultural resource overviews and sample-oriented inventories is explored through the use of specific examples. Advantages and disadvantages of regional research designs are identified, and their effects upon the management of cultural resources and the designing of specific projects within a given area are discussed. (4)

Nickens, Paul R. (see Reed, Alan D.) (8)

Norr, Lynette Caryl (Illinois) **STONE BURIAL MOUNDS AND PETROGLYPHS: PRELIMINARY INVESTIGATIONS IN THE RIO NARANJO-BIJAQUA INTERMONTANE VALLEY, NORTHWESTERN COSTA RICA** Recent work in the central corridor segment of a transect from the Gulf of Nicoya to Lake Nicaragua represents one of three areas presently under investigation to study Atlantic-Pacific contact and exchange in northwestern Costa Rica. The results of preliminary survey and excavations are discussed with an emphasis on Zoned Bichrome period (300 B. C.-A. D. 300) stone burial mounds and associated petrogllyphic boulders. The project format is presented, and future objectives are noted. (28)

Novick, Andrea Lee (Institute of Archeology and Anthropology, South Carolina) **CURATION OF DOCUMENTATION** The increasing growth of archaeological research and contract work has resulted in a tremendous increase of archaeological collections. Often these collections have been viewed as a means to an end, artifacts to be collected, reported, and then stored at an institution. Records documenting site location, field notes, artifact analysis, and collection origins are often left incomplete. It is imperative that archaeologists realize that these collections are the future data base. In the coming years these collections will be analyzed and reanalyzed in light of a number of different research designs and problems; therefore accurate documentation is essential. (31)

Nowack, Judith A. (Michigan) **CERAMIC PRODUCTION IN EARLY CLASSIC TEHUACAN** Data relating to the organization of production of ceramics during the Early Palo Blanco period (about

150 B.C.-A.D. 250) in the Valley of Tehuacan, Mexico, as derived from surface survey of major sites, are presented. Production locales are hypothesized on the basis of the frequency and distribution of production defects. An attempt is made to explain the archaeological distribution of style and form attributes as a product of specific sociocultural distribution mechanisms. (5)

Nowak, Michael (Colorado College, USFWS) **OCHER AND OCEAN BAY Excavations at KOD 224**, a stratified site on Uganik Island (part of Kodiak National Wildlife Refuge) turned up evidence that suggests that the red-stained deposits often associated with Ocean Bay I are due to deliberate cultural activity rather than the natural weathering of hematite. Recovery of a concave grinding slab filled with ocher and four grinding stones on a heavily ocher-stained floor suggest this inference. The site sits at the conjunction of an open bay and a lagoon system, providing access to both littoral and deep-sea resources. (44)

O'Connell, James F. (Utah) **SITE STRUCTURES AND DYNAMICS AMONG MODERN ALYAWARA HUNTERS** Recent investigations of intra-site spatial organization among the Alyawara, a central Australian hunting population, are reviewed in detail. Individual household camps and special activity areas are described, and the factors that determine their distribution within sites are identified. The Alyawara pattern is compared with that described by Yellen for the !Kung, and the results are expressed in a modification of Yellen's Ring Model. Implications of the changed model for current approaches to the analysis of prehistoric intrasite spatial organization are identified and discussed in terms of specific examples drawn from the literature. (33)

Odell, George H. (Brown) **THE EXPERIMENTAL USE OF STONE PROJECTILE POINTS: SOME IMPLICATIONS FOR THE FUNCTIONAL ANALYSIS OF PREHISTORIC ARTIFACTS** Although a considerable amount of experimentation has now been performed on damage accruing to stone tools from utilization, very little basic experimentation has been done on the results of projectile point usage. This paper describes a series of experiments in which various lithic raw materials were employed to provide points on arrows and spears, then tested by firing them into objects of various kinds. Results suggest a wide range of damage forms and a consistent difference between the portion of the point under the hafting device and that outside it. (72)

Ohel, Milla Y. (Cincinnati) **TECHNOLOGICAL EFFICIENCY IN PREHISTORIC ALT ASSEMBLAGES FROM NORTHWESTERN FRANCE AND SOUTHEASTERN ENGLAND** Five ALT (= Acheulean with Levallois technique) assemblages from each region are examined. An analysis of flake attributes shows that the French ALT was more standardized and efficient than the English ALT. This constitutes a primary step to be followed by additional ones in order to explain the differential level of technology between the two. (23)

Oliver, James S. and David W. Von Endt (Smithsonian Institution) **A HISTOLOGICAL PROCEDURE FOR IDENTIFYING THE ANTLERS OF CARIBOU, MOOSE, ELK, AND VIRGINIA DEER: A NEW TOOL FOR ARCHAEOLOGISTS** A histological study of skeletal bones, ivory, and four types of cervid antler demonstrated that each possessed a unique vascular structure. The vascular canals of caribou antler are oriented in a parallel (plexiform) manner. The canals of elk are distributed longitudinally and oriented along the vertical axis of the antler. Virginia deer antler exhibits a reticular structure with slight parallel patterning toward the cortex. Moose antler displays a well-developed reticular structure with many canals running perpendicular to the cortex. These findings have been tested by taking small sections from several archaeological tools and identifying the raw material. (25)

Olsen, Stanley J. (Arizona) **ARCHAEOLOGICALLY, WHAT CONSTITUTES AN EARLY DOMESTIC ANIMAL?** Too often domestic animal species are listed as occurring in early Near Eastern archaeological sites when in reality these identifications may be based on inadequate osteological material to arrive at such close taxonomic determinations. (25)

Olson, Gerald W. (Cornell) **EFFECT OF VOLCANIC ERUPTIONS UPON SOME MAYA SOILS IN EL SALVADOR** The area affected by the Ilopango volcanic eruption in El Salvador shows evidence of the deterioration of the soil resources. Sites are buried under two volcanic eruptions: one 1,000 years ago and another 1,000 years earlier. A widespread superior deep (1-2 meters) weathered clayey reddish soil was discovered at a depth of several meters under the present landscape formed during a period of geologic stability (extending from about 40,000 to 2,000 B. P.), and then was buried. In places at least three superimposed soil profiles with Maya artifacts have developed in the different tephra layers. (4)

Olszewski, Deborah and Alan H. Simmons (Arizona) **DIFFICULTIES WITH THE ANALYSIS OF SOUTHWESTERN LITHIC ASSEMBLAGES** A consistent and detailed lithic analysis concentrating on technological attributes was applied to a series of assemblages from central Arizona representing a wide geographic and temporal span. The analysis included total assemblages,

although the emphasis was on debitage. Lithic analysis in the Southwest has long overemphasized tools and yet frequently lacks clear criteria for defining formal types. Our analysis suggests that many of the assemblages observed are opportunistic and contain but few formal tool types. An analytical procedure involving debitage analysis that emphasizes technological variability is seen, therefore, as a profitable avenue of investigation. (8)

Parsons, Cindy J. (see Snaveley, Alan N.) (20)

Paterson, Susan (see Hansen, Greta) (37)

Pavesic, Max G. (Boise State) RECENT FINDINGS AT THE BRADEN BURIAL SITE, WESTERN IDAHO Test excavations at the Braden burial site have revealed new evidence of possible multiple interments of secondary burials. This discovery casts some question on the age of a previously dated "mass" burial feature. The question now is whether the site contains multiple burial components of different ages. The 1978 excavations also encountered heavy concentrations of red ochre and a few metallic crystals, common Archaic burial expressions. The summer's fieldwork was supplemented by archival and museum research to document related private collections in western Idaho. (41)

Pavlish, L. (see Farquar, R. M.) (36)

Paynter, R. W. (CUNY-Queens) FROM SETTLEMENT SYSTEMS TO SETTLEMENT PATTERNS: A STUDY IN NON-EXPERIMENTAL CONTROL Prehistoric settlement analyses usually assume a simple relation between geographic models of human locational behavior and archaeologically recovered settlement patterns. This hypothetical simple relation is studied for the settlement patterns of stratified societies. Data are drawn from the relatively well controlled domain of historic archaeology—particularly the Connecticut River Valley. The spatial distribution of an archaeological index is compared to the spatial distribution of variables more closely related to geographic models. Particular attention is paid to how these relations change across a range of stratified societies. The results are suggestive of the nature of this relationship in various prehistoric cases. (2)

Peebles, Christopher (Michigan), Vincas Steponaitis (Smithsonian), Margaret Schoeninger (Michigan), and Margaret Scary (Florida Division of Archives, History, and Records Management) TEMPORAL AND BEHAVIORAL DIMENSIONS OF RANKING AT MOUNDVILLE Continuing analyses of materials from Moundville, a Mississippian ceremonial center in west-central Alabama, have focused on the fine-scale seriation of the ceramics found in the graves, the trace element composition of human bone, and the recovery of food remains. The provisional results of this work give (1) a chronological framework to the development of differences in social status, (2) potential dietary correlates of ranking, and (3) the implications of agricultural intensification for demographic structure and social organization. (13)

Perlman, Stephen (Virginia Commonwealth) OPTIMUM FORAGING BEHAVIORS AND NUT RETURN RATES Predictive models have generated implications for temperate forest hunter-gatherer settlement patterns. These models have stressed the impact of meat protein on site location. This situation reflects the return information available to the archaeologist and not assumptions that vegetation is unimportant. To fill this gap, the behavioral correlations established by optimum foraging strategy models and tests will provide a framework for generating general expectations for gathered nut returns. A nut gathering experiment verifies the value of these behavioral correlations for man. The results of the experiment establish some implications for hunter-gatherer subsistence strategies and associated behavior. (2)

Perlman, Stephen M. (see Green, Stanton W.) (2)

Peterson, Drexel A., Jr. (Memphis State) MIDDLE ARCHAIC CULTIGEN FROM MISSISSIPPI The Mann site on Yellow Creek in Tishomingo County, Mississippi, has multiple Archaic components. Charred sunflower remains have been recovered from Middle Archaic midden. These are interpreted as evidence of Southeastern plant cultivation before 2500 B. C. (29)

Pettigrew, Richard (Oregon) PROBLEMS IN THE FUTURE OF LOWER COLUMBIA RESEARCH To help channel archaeological energies in useful directions in Lower Columbia research, this paper summarizes some of the major archaeological problems yet to be faced. Among these problems are a need for geological study of recent floodplain deposits, a lack of floodplain sites known to be older than 3,000 years, gaps in the record of the last 3,000 years, a lack of broad surveys for studies of settlement patterns, and needs for more large-scale excavation of sites, botanical and wildlife studies, ethnohistorical research, and cross-regional comparisons of archaeological data. (3)

Phagan, Carl J. (Ohio Historical Society) VARIABILITY IN JAYWA PHASE LITHICS In explaining prehistoric cultural development, "phases" are frequently established as convenient time-content categories for description and comparison. The extent to which these phases reflect actual behavioral regularity, however, is seldom specifically determined. In this paper, both flakes and implements from four components assigned to a single cultural phase of the Ayacucho sequence are examined in detail to establish kinds and ranges of technological behavior represented. Technological evaluation is based on a 28-attribute flake analysis and a 23-attribute implement analysis. Results are used to support statements concerning the nature and range of technological production behavior reflected in the lithic materials. (1)

Pippin, Lonnie (see Budy, Elizabeth) (4)

Plog, Fred (Arizona State) DEALING WITH SITES: PRESERVATION OR ARCHAEO-POKER? Although the conceptual framework of cultural resource management has developed rapidly, confusion and/or implicit disagreement on a number of critical issues remains. This paper examines three such issues: the relationship of management information to research, the relationship between preservation and data recovery programs, and student participation in contract programs. Academic and agency archaeologists share responsibility for these problems. Their resolution will come not from theoretical discussions of the meaning of such concepts but from substantive applications, more thorough explorations of concepts such as preservation in relation to comprehensive summaries of the cultural resource base in specific areas. (17)

Plog, Stephen (Virginia) MEASUREMENT ERROR IN ANALYSES OF CERAMIC VARIATION Ceramic variation is increasingly being analyzed as a means of measuring variables such as site function. The analyses frequently are based on attributes that are difficult to measure and thus are very much subject to measurement error. However, little is actually known about the magnitude of such error. An attempt is made to assess the importance of measurement error in explaining variation in ceramic attributes. (22)

Pomerantz, Howard J. (SUNY-Buffalo) THE ORIGINS OF DOMESTICATION: AN EXPLICITLY OBJECTIVE APPROACH TO THE PROBLEM Utilizing a multivariate statistic approach to test objectively alternative hypotheses purporting to explain the origins of agriculture, it is demonstrated that neither the "Childian" climatic determinant model nor the "Binfordian" demographic theory is independently sufficient to explicate the process. Rather, a complex interaction of the two variables provides a much more acceptable model of the situation observed in the Levant, one of the earliest centers of cereal domestication. The method and results presented here have application and important implications for solving the basic problem of the development of agriculture. (38)

Portnoy, Alice W. and William J. Mayer-Oakes (Texas Tech) DETERMINING ARCHAEOLOGY: AGENCY ORIENTATIONS Many federal and state agencies are instituting contracts with professional archaeologists for cultural resource management work. They include "regulatory" agencies oriented to clearance/compliance, "management-oriented" agencies (e.g., National Park Service, Interagency Archeological Services, Bureau of Reclamation, Corps of Engineers). Most archaeologists are unaware of how these different orientations affect the discipline of archaeology itself in many important ways, including types of service, contract, and project; quality of work; results of research; use of data; and level of agency direction of research in planning and controlling. Various agency orientations and their effects on archaeology are discussed. (39)

Powell, Shirley and Anthony L. Klesert (Southern Illinois) PREDICTING STRUCTURES ON SMALL ARTIFACT SCATTERS One aspect of the Black Mesa Archaeological Project research design is interpreting artifact scatters within the prehistoric settlement/subsistence system. A specific goal is to predict the subsurface nature of such sites based only on surface structural remains. Discriminant analysis will be employed to test this proposition. The nonstructural variables will then be used to predict the presence of structures on all unexcavated sites in the eastern lease area of Black Mesa. (38)

Power, Marjory W. (Vermont) THE WINOOSKI SITE: A TEST CASE FOR A MIDDLE WOODLAND SETTLEMENT SUBSISTENCE MODEL Recent contract work in Northwestern Vermont has revealed dense concentrations of Middle Woodland component sites located at the mouths of large tributary rivers entering Lake Champlain. The large stratified Winooski Site, which lies between the Lower Falls of the Winooski River and the lake, serves as a test case for a proposed Middle Woodland settlement subsistence model useful for the Champlain Valley. A heavy reliance on multidisciplinary contributions permitted formulation of the model, which involves seasonality and selective resource exploitation through time. (40)

Pratt, Marjorie K. and Peter P. Pratt (Pratt & Pratt Archaeological Consultants) A SUBSURFACE RADAR AND RESISTIVITY SURVEY IN AN URBAN SETTING An SRI-International team has

brought into subsurface survey ca. 5 km of proposed sewer line in Oswego, New York. The line traverses historical buried remains, including the earliest shipbuilding yards on the Great Lakes, 18th-century Fort Oswego, and a 19th-century iron foundry. Resistivity surveying is seen to complement radar surveying nicely in areas where soil conductivity is high. Together, the techniques provide excellent coverage to a possible maximum depth of 9 m. (6)

Pratt, Peter P. (Pratt & Pratt Archaeological Consultants) **RADAR IN ARCHAEOLOGY: AN INTRODUCTION** The first application of radar in archaeology was performed in 1974 by Stanford Research Institute (now SRI International) at Chaco Canyon, New Mexico. The striking success of that project has led to continued research in subsurface radar sensing within both prehistoric and historic contexts. This new survey technique alone or as part of a "package" of ground-penetrating sensing methods appears to represent a quantum jump in archaeological survey methodology. (6)

Prewitt, Terry J. (Tulsa) **SYSTEMIC OVERVIEW OF PALEOCLIMATIC FLUCTUATIONS IN NORTH-CENTRAL OKLAHOMA** A systemic overview of recent climatic fluctuations and cultural adjustments is presented for the area of Copan Lake, northeast Oklahoma. Local depositional sequences derived from geomorphic and archaeological investigations are related to general patterns of subhumid and arid deposition, taking into account regional and local contributions to a basically aggradational pattern. Local structural controls that produce variable deposition are described. Depositional data indicate a climatic shift at about A. D. 1000 involving adjustments in the annual rainfall cycles from well-distributed to poorly distributed storm patterns. This is supported by ancillary data from pollen and snail analyses, including local and regional materials. (50)

Pring, Duncan (London) and Joseph W. Ball (San Diego) **THE CERAMIC SEQUENCE AT CUELLO** The ceramic sequence at the Cuello site covers the Early Formative to Late Postclassic, the Formative deposits providing a stratigraphic and carbon-dated sequence to calibrate the nature and rate of ceramic change, the later periods being established by comparison with the general north Belizean sequence from Nohmul and other sites. The salient features of the sequence are outlined, and its relationship with sequences from other Maya sites in this and adjacent regions discussed. (10)

Purdy, Barbara A. and Raymond F. Willis (Florida) **RECOVERY, PRESERVATION, AND STUDY OF WOODEN ARTIFACTS IN FLORIDA** Since the 1890s, when the Key Marco Site was excavated, many sites with similar preservation conditions have yielded a variety of wooden objects providing unquestionable evidence that the prehistoric inhabitants of Florida were skilled wood-working technologists. Recent drought conditions have drastically lowered water levels of lakes and rivers, exposing strata with entombed canoes and other wooden items. Recovery, dating, storage, preservation, and study of these specimens are imperative, but logistics problems exist. These difficulties are weighed against the overall benefits to be derived if the problems are solved, such as knowledge about stylistic variations, manufacturing techniques, and wood preferences and properties. (37)

Quilty, K. (see Ammerman, A.) (49)

Rafferty, Kevin (SUNY-Stony Brook) **THE GILA BUTTE SITE: A STUDY OF THE DYNAMICS OF SITE GROWTH AND SOCIAL STRATIFICATION AMONG THE HOHOKAM** This paper will compare various methods for studying the dynamics of site growth and social stratification at a large Hohokam site on the Gila River of southern Arizona. This site consists of a minimum of 56 mounds and 2 ball courts in a square-mile area around Gila Butte. The data consist of sample collections of surface artifacts. Seriation, multidimensional scaling, and clustering will be used to examine the variability in ceramic styles in an attempt to separate the effects of various factors such as time, social stratification, and function in the development of the site. (27)

Randsborg, Klavs (Copenhagen) **DATA ON DEATH AND VIKING AGE STATE FORMATION IN DENMARK** Mortuary practices during the Viking Age (8th to mid-11th century) in Denmark are examined, this being a period during which the West Danish State was formed. Some of the problems inherent in analysis of complex societies' mortuary practice patterns are described, and some of the unique features of this culture are noted, including runic stones defining succession, the adoption of Christianity in place of a traditional religion, and the decline in the practice of including property in graves. (13)

Rapp, George R., Jr. (see Gifford, John A.) (47)

Rasson, Judith A. (Wilkes) **THE USE OF CLIMATIC DATA IN ECOLOGICAL MODELS** The environment is not merely the neutral medium in which culture exists. It is the support system that acts

on and is acted upon by culture. By devoting more analytical time to elucidating environmental systems, archaeologists also clarify cultural systems. An independent model of the past environment is required, based on the present environment, the known past environment, and ecological principles. Comparing independent cultural and environmental models clarifies both and thereby the nature of the cultural adaptation central to the research. Research on climatic variability in modern Yugoslavia will be applied to a model of Neolithic behavior. (21)

Rathje, William L. (Arizona) **DENTAL MUTILATION AND THE CLASSIC MAYA** The internal structure of Classic Maya society has often been studied through the use of burials. One particularly interesting characteristic of Maya burials is dental mutilation, which occurs in the form of both filing and inlaying of teeth. Patterns in dental mutilation from several Classic Maya sites will be compared. Specific types of filing and inlaying will be related to specific role positions in Classic Maya society, and differences in patterns between sites will be related to a general model of social mobility and resource diversity. (13)

Rattray, Evelyn C. (UNAM) **CERAMIC PRODUCTION AND SOCIAL ORGANIZATION AT TEOTIHUACAN** Evidence for production and distribution of major Teotihuacan wares is examined using data from the prehistoric urban center of Teotihuacan. The results of this investigation shed some light on the social organization of Classic Teotihuacan and in turn allow a better understanding of prehistoric production and the institutional controls that operated at the barrio and state levels. (5)

Reagan, Michael and Ralph Rowlett (Missouri-Columbia) **AN EARLY MAN SITE IN NORTHWEST MISSOURI** Two early assemblages were recovered from the Shriver site, from two different loesses of the last glaciation. The paleo-Indian occupations at 8690 ± 1000 B.C. and 12,855 ± 1500 B.C. are dated by thermoluminescent analysis. On the basis of geologic correlation, lithic analysis, and cultural stratigraphy, an age older than 13,000 B.C. is proposed for the Lithic stage occupation. Artifacts of the Lithic stage assemblage, including tools struck from prepared cores, and artifacts of the paleo-Indian assemblage are compared with artifacts reported for other early sites. (45)

Reed, Alan D. (Centuries Research), Susan M. Chandler, and Paul R. Nickens **AN ANALYSIS OF ECOLOGICAL VARIABILITY AND SITE LOCATION IN SOUTHWESTERN COLORADO** During 1978, Centuries Research conducted a random, stratified, sample-oriented cultural resources inventory of the Bureau of Land Management's Sacred Mountain Planning Unit, an area of approximately 217,000 acres in southwestern Colorado. Seven ecological strata were defined throughout the study area. The inventory results are cross-tabulated and analyzed against the ecological strata and other sets of variables to produce both synchronic and diachronic models of site location in the project area. (8)

Reid, J. Jefferson (Arizona) **WHEN ARCHAEOLOGY FAILS** A critical look is taken at potential excesses in contemporary archaeological research. Major misdirections discussed are when research is treated as methodological virtuosity, as a literary form, as little more than fieldwork, and as a duplication of conventional wisdom. Mention is made of the "Mr. Roger's Effect." Design, data collection, analysis, and reporting are emphasized as equally crucial phases of the research process. The point is made that while small-scale research projects can absorb the effects of naive and overzealous misdirection, large-scale programs run the utterly dismal risk of abject failure. (38)

Reidhead, Van A. (Missouri) **HUNTER-FARMERS IN EASTERN NORTH AMERICAN PREHISTORY: THE LIMITS TO GROWTH** This paper uses economic models to examine some of the ecological determinants of population growth and adaptation among agricultural peoples in prehistoric Eastern North America. It is demonstrated that the dual importance of hunting and agriculture in these systems posed important limitations, which, at certain levels, were incompatible with respect to the total growth potential of populations. (40)

Reynolds, Georgeanne L. and William S. Laughlin (Connecticut) **PHASE ANALYSIS OF ANANGULA CORES AND ITS APPLICATION TO LITHIC STUDIES** Phase analysis is viewed as an analytical method in the categorization of certain lithic tool classes. Traditional methods are of value but lack insight into the "lifetime" of the artifact, tending instead to "freeze it in time." All phases of manufacture are present in the series of cores from the 1974 field season on Anangula Island in the Aleutians. The collection is analyzed, accounting for the wide range of variation present and including those specimens not conveniently typed. Traditional typologies are questioned and applications to other assemblages suggested. (42)

Rice, Don S. (Chicago) and Prudence M. Rice (Florida) **SETTLEMENT STUDIES IN THE CENTRAL PETEN SAVANNAS** This paper reports recent archaeological research into the utilization of

savanna regions of the Central Peten, Guatemala, by aboriginal Maya populations. Survey data are presented on the size and configuration of Maya occupation within the savanna region, together with a preliminary chronological framework for the evaluation of settlement dynamics within sampled savanna areas. Environmental information is combined with settlement data to hypothesize the pattern of Maya land use and to assess the role of Maya populations in the formation, maintenance and/or spread of savannas. (9)

Rice, Glen E. (Arizona State) MODELING MICROENVIRONMENTAL REDUCTION The transition from a seasonal round to a sedentary intensive agricultural system involves increased sedentism and a reduction in the diversity of the resource base. One aspect of this process of "microenvironmental reduction" (Flannery and Coe 1968) is simulated using a monte carlo technique. The model is then applied to a twelfth-century settlement pattern change in the Mogollon tradition as an alternative to explanations citing such processes as environmental deterioration (Zubrow 1971), population growth (Plog 1974), drought, or warfare (Danson 1957; Bluhm 1960). (48)

Rice, Prudence M. (Florida) SOME CONSIDERATIONS FOR THE STUDY OF SPECIALIZED POTTERY PRODUCTION Craft specialization is hypothesized to be a process of regularizing behavioral and material variety in extractive and productive activities. The paper discusses criteria for archaeological recognition of products of specialized pottery manufacture and presents a model of the evolution of such specialization. Pottery specialization is hypothesized to begin in the area of prestige/ceremonial goods, manifested earliest through standardized paste attributes. In complex societies pottery manufacture is increasingly an exercise in standardized mass production, and elaboration exists chiefly in elite/ceremonial goods. (14)

Rice, Prudence M. (see Rice, Don S.) (9)

Rick, Anne M. (National Museum of Natural Sciences, National Museums of Canada) SOME PROBLEMS AND SOLUTIONS IN ZOOARCHAEOLOGICAL INTERPRETATION OF BIRD BONES Bird bones are an important component of archaeological fauna; yet their study was often neglected in the past. In recent years there has been a vast increase in the capability of identifying bird bones, and archaeological interest in these vertebrates has intensified. Even when present in small numbers, bird remains can often provide valuable evidence of site seasonality, hunting strategies, and habitat utilization. This paper considers two critical problems in the study of avian faunal remains: identification and seasonality. (25)

Roberts, Michael E. (Harvard) SUBSURFACE RADAR AND PREHISTORIC SITES Three known sites are used to test the ability of subsurface radar both to locate these sites and to describe their internal structure. It is concluded that radar is more applicable to internal mapping than to field location. (6)

Robinson, Stephen W. (U.S. Geological Survey) and Gail Thompson RADIOCARBON CORRECTIONS FOR MARINE SHELL DATES WITH APPLICATION TO PREHISTORY OF THE SOUTHERN NORTHWEST COAST Radiocarbon dates on marine shells are reliable and accurate data for constructing prehistoric chronologies within the Holocene if corrected for the apparent age of dissolved marine bicarbonate (the reservoir age). New radiocarbon analyses of pre-nuclear twentieth-century marine shells indicate a reservoir age correction of  $-801 \pm 23$  years for Oregon and Washington coasts and the northern Puget Sound and  $-680 \pm 15$  for the California coast. We apply reservoir age corrections to several archaeological shell dates from the southern Northwest Coast and obtain excellent agreement with extant chronologies based on charcoal samples. Reservoir age corrections for other coasts are summarized. (7)

Rockman, Diana diZ. (New York) and Nan A. Rothschild (CUNY-Hunter) VARIATION IN ADENA MORTUARY SITES Adena, whether seen as a mortuary complex, culture, style zone, or time period, has been poorly understood since its definition in 1920. Much of the variability within Adena has been ignored or linked purely to temporal sources. This study examines several variables in a number of Adena mortuary sites, with the aim of discerning whether (a) Adena represents a single cultural and social phenomenon and (b) social structures of equivalent levels of complexity are apparent throughout the Adena area. Sources of variation are also considered. (13)

Rogers, Anne F. (Georgia) VARIATION IN MAGDALENIAN LITHIC ASSEMBLAGES Recent analysis using statistical techniques has indicated that variability in Magdalenian lithic assemblages is only partially attributable to temporal and spatial differences. Analysis of tool counts from 135 assemblages resulted in the formation of five major clusters, each containing assemblages from diverse locations and time periods. These groups were then examined to determine the underlying variability responsible for the assignment of assemblages to clusters, resulting in the discovery that certain tool types differed in relative frequency from one group to

another. The recognition of this aspect of variability in these assemblages provides new information concerning technological differences that existed during this period of the Upper Paleolithic. (23)

Rohn, Arthur H., Don Blakeslee, and Sam Heitha (Kansas State) ENVIRONMENTAL RECONSTRUCTION FOR HILLSDALE LAKE, KANSAS Archaeological sites in the Hillsdale Lake District, eastern Kansas, indicate a long record of varying adaptation to a rather stable, Prairie-Woodland ecotone zone. Paleoenvironmental reconstruction based upon soil and aerial photographic studies indicates surprising continuity of basic vegetation and soil patterns over a 5,000-year period. Stream regimen analysis in intermittent creeks of the area accounts for factors contributing to water pooling; the stream-pool system contributes to a predictive model for site location. An orientation toward the diverse resources of the ecotone and localized water influences site clustering for all archaeological periods represented in the study area. (50)

Ross, Richard E. and Sandy L. Snyder (Oregon State) RIVERINE ADAPTATIONS ON THE CENTRAL OREGON COAST The Umpqua site (35DO83) is located near the mouth of the Umpqua River on the central Oregon coast. It is one of the few known sites in this area that shows sequential occupational layers over a relatively long time. There is some evidence to suggest that the site was utilized as a semipermanent base, as opposed to many of the shell middens along the coast, which were occupied for rather short durations. The earliest material, consisting of a few lithic tools, lies directly on the alluvial clays of the terrace. Later portions of the site show refuse activity, including small shell concentrations. The shell in the site has helped the preservation of bone material; so a good collection of perishable artifacts and identifiable faunal material have been recovered. This phenomenon, as in many other coastal sites, allows for relatively detailed analysis of aboriginal resource utilization by the inhabitants. (24)

Ross, Richard E. (Oregon State) and Esther Stutzman (Coss Indian Tribal Council) INDIANS AND ARCHAEOLOGISTS: AVOIDING THE CIRCLED WAGON TRAIN SYNDROME Native Americans and archaeologists are interested in many of the same questions about peoples in the Americas—when they got here and the kind of adaptation strategies that were subsequently employed. The two groups of people have generally approached these problems from very different perspectives. More recently, however, the two groups have been faced with situations where mutual involvement is critical. It is our belief that Native American and archaeological goals and resources are quite similar. This paper examines the resource (archaeological sites) from two viewpoints while trying to identify some of the mutual interests. (39)

Rothschild, Nan A. (see Rockman, Diana diZ.) (13)

Rowlett, Ralph (see Reagan, Michael) (45)

Runnels, Curtis N. (Indiana) LITHIC TECHNOLOGY IN THE IRON AGE OF THE OLD WORLD The hypothesis that chipped stone tools were completely replaced by metal ones in the Iron Age is refuted. The data include published evidence of recent tool use (glass, gun flints, threshing sledges, medieval artifacts) as well as unpublished assemblages from Iron Age sites in Greece. The competing uses of stone and metal tools are stated, and the survival of stone tools is explained in analytical economic terms. The utility of stone is stated as a function of the price of metal, which is directly proportional to the distance of use area from distributional center. (23)

Rutter, Nathaniel W. (Alberta) LATE QUATERNARY CLIMATIC RECONSTRUCTION OF THE AYACUCHO BASIN AREA OF THE CENTRAL PERUVIAN ANDES Paleoclimates were determined for the late Quaternary. Surface soils vary from lithosols in low, dry, hot areas, through several varieties of chernozems in middle elevations, to soils similar to Arctic Browns in high, moist, cool areas. Buried soils are progressively better developed with increasing age than their surface counterparts in the same ecological zone. Two periods of valley glaciation are detected in the higher elevations. Results, aided by pollen analysis, suggest that the climate has become slightly drier during the past 14,000 years. Ecological zones have remained about the same with perhaps a slight upward shift in elevation. (1)

Ryder, Peter R. (Museo Nacional de Costa Rica) PRELIMINARY STUDY OF THE GUAYABO DE BAGACES REGION, GUANACASTE, COSTA RICA The preliminary study of the Guayabo de Bagaces region undertaken by the National Museum of Costa Rica in the volcanic cordillera of Guanacaste, northern Costa Rica, represents the first such research in the region. Twenty sites were located; of these, 18 are mortuary-cemeteries of stone burial mounds—all but one dating to the Zoned Bichrome Period (300 B.C.—A.D. 300) or the Early Polychrome Period (A.D. 300–800). Excavation of a section of a mound revealed as well-defined infrastructure enveloping individual slab tombs. The data recovered are utilized to infer tentative social characteristics of the prehistoric community that built the mounds. (28)

Sabo, George (Michigan State) and John D. Jacobs (Windsor) THULE CULTURE ADAPTATIONS IN SOUTHERN BAFFIN ISLAND Archaeological and environmental data from Thule culture sites located along the south coast of Baffin Island, N.W.T., are analyzed to clarify ecological relationships underlying Neo-Eskimo adaptations from ca. A.D. 1100 to the beginning of the present century. Long-term stability and continuity in the organization of subsistence technology, settlement patterns, and resource procurement are noted. Adaptation to broad-scale regional environmental characteristics, based upon flexibility in exploitative orientation, group structure, and demographic arrangements permit strategic responses to short-term environmental fluctuations without major structural changes in subsistence organization. (44)

Saleeby, Becky (Oregon) and Candace Levy (Pennsylvania State) PREHISTORIC AND HISTORIC USAGE OF FAUNAL RESOURCES ON EASTER ISLAND This study represents the first thorough faunal analysis conducted on Easter Island. The authors concentrated on the mammalian fauna in order to round out a previous analysis based on the marine remains of the island. The main goals of this study were (1) to determine if there was intransigent variation in the utilization of fauna, (2) to determine the changes in subsistence due to the introduction of European domesticated mammals, and (3) to determine changes in intensity of cave occupation during historic vs. prehistoric times. (40)

Salkin, Philip H. (Wisconsin-Whitewater) THE POSITION OF WESTERN CONNECTICUT IN THE PREHISTORY OF SOUTHERN NEW ENGLAND The product of two seasons of excavation in the Housatonic Valley in Western Connecticut is discussed. This area has received almost no professional investigation, and assumptions about its prehistory are made by inference from other areas or ethnohistorical sources. The excavated materials provide some insight into the various different cultural influences that impinged on the area. Of special interest are the close affiliations of the Early and Middle Woodland assemblages to those of central and northern New York and the Upper Hudson Valley as opposed to the geographically closer cultures of the coastal areas. (2)

Sanger, David (Maine-Orono) TOWARDS A MODEL OF MARINE ADAPTATION: RESEARCH IN THE GULF OF MAINE In various parts of the world, societies with a hunting-gathering economy have flourished in marine environments. Five key factors will usually be present where high human density marine adaptations are found: (1) high plankton concentrations; (2) animals (converters) predated on the plankton; (3) suitable capture and storage technology; (4) estuarine settings with significant intertidal zones; (5) a supportive terrestrial environment to compensate for periods of low marine productivity. These five criteria serve to outline a model that can guide research strategies and serve as a predictive device for locating areas suited to marine hunters and gatherers. (24)

Santley, Robert S. (New Mexico) PRICING POLICIES AND THE DECLINE OF TEOTIHUACAN CIVILIZATION Teotihuacan is regarded as having exerted far-flung influence throughout pre-Columbian Mesoamerica. Recent research at Teotihuacan has demonstrated that a large amount of activity was devoted to obsidian working. In this paper the discriminatory pricing model is applied to obsidian industry and exchange system centered at Teotihuacan, since it provides a measure of the capital returned to Teotihuacan from exchange ventures abroad. Implications concerning the internal dynamics of Teotihuacan-dominated exchange and Teotihuacan's collapse are drawn; the Teotihuacan system is found to be too hypercoherent, with effective competition from other manufacturing/trading loci providing the stresses necessary for systemic decline. (9)

Sappington, Lee (Idaho) THE LYDLE GULCH SITE: OBSIDIAN SELECTION AND PROCUREMENT IN THE NORTHERN GREAT BASIN Analysis of the Lydle Gulch site in southwestern Idaho indicates that this prehistoric open site was typical of temporary hunting camps in the Northern Great Basin periphery. The artifact assemblage shows an occupation from Archaic through Late Prehistoric periods, a span of 5,000 years. Approximately 80% of the lithic material is obsidian, although the nearest source is 40 miles away. X-ray fluorescence analysis indicates the use of 11 obsidian sources, although only a few were favored throughout the entire occupation. Other results include a minimal use of exotic material and continuity in selection and procurement despite technological changes. (41)

Saxe, Arthur A. (Ohio) NAN MADOL ON PONAPE, EASTERN CAROLINE ISLANDS, MICRONESIA The presence of relatively complex sociocultural systems in the small and scattered Caroline Island chain in the Pacific is yet to be explained. Recently such research has been initiated on several fronts. Nan Madol appears to have been the administrative center of Ponaape Island and of several islands. It is sometimes referred to as the "Venice of the Pacific" because of its location on approximately 100 man-made islands. Linkages between oral tradition, the monumental basalt architecture of *Nan Dowas* (largest above-water structure), and the mortuary architecture of high-ranked bureaucratic tombs facilitated the task of bounding the site. (13)

Scarry, Margaret (see Peebles, Christopher) (13)

Schacht, Robert M. (Rice) PROCESSUAL CHANGE IN EMPIRES It has long been appreciated that empires, whatever they may be, are not static entities. This paper attempts to utilize the Binfordian paradigm for the study of culture process (in *Historical vs. Processual Archaeology and Archaeological Systematics and the Study of Cultural Process*) to re-evaluate two of the most substantial comparative studies of empires, those of Toynbee (in *A Study of History*) and Eisenstadt (in *The Political Systems of Empires*). The utility of employing in this context some of the systems-theory principles outlined by Flannery in *The Cultural Evolution of Civilizations* will also be explored. (46)

Schalk, Randall (Washington Archaeological Research Center) VARIATION IN HOME RANGE SIZE IN ABORIGINAL NORTHWEST COAST SOCIETIES A model of home range size among hunter-gatherers is formulated. It is hypothesized that home range size varies positively with resource clumping and inversely with resource density. A sample of aboriginal groups along an environmental gradient of the Northwest coast of North America is employed to test this proposed relationship. Indices of resource distribution are developed with climatic data and used to predict variation in the dependent variable (home range size). The hypothesis is given strong support, and implications for other aspects of land use are discussed. (43)

Schiffer, Michael B. (Arizona) THE EFFECTS OF OCCUPATION SPAN ON SITE CONTENT: A SIMULATION APPROACH It has been shown theoretically and in several empirical studies that the occupation span of a site (its duration of occupation) has important quantitative and qualitative effects on assemblage composition—even in single-component sites. This study examines the general effects of occupation span on site content by means of a computer simulation model. The results of this effort make it possible to evaluate previous hypotheses and to propose new ones. (38)

Schlanger, Sarah H., William D. Lipe, and Timothy A. Kohler (Washington State) PROCESSES OF GROWTH IN SOUTHWESTERN PUEBLOS Archaeological indices of population trends provide one approach to research in prehistoric demography. Assumptions concerning the systemic behavior of an index, the reaction of the index to changes in population size, and the incorporation of the index into the archaeological record must be carefully formulated and examined before the index is applied. One recently suggested index—number of beams cut per year in Pueblo habitation sites—was examined by simulation modeling. Results suggest that systemic factors—particularly variations in reuse rates—limit the measure's applicability. The study also suggests that some other indices of prehistoric demographic trends may be similarly misapplied. (20)

Schoenberg, Kenneth M. (National Park Service) THE ARCHAEOLOGY OF THE UTUKOK RIVER, ALASKA In the summer of 1978, an intensive survey of the Utukok River from Driftwood Creek to Eskimo Hill in northwestern Alaska was conducted by a National Park Service crew. Almost 100 new sites were recorded. Much of this area had been covered briefly by Robert Humphrey in 1965-1966, and he reported a chronology for the area (Humphrey 1970) and advanced a hypothesis concerning "early fluted points" found in the area. A description of the archaeology of the Utukok River, based upon the findings of the 1978 season, is made, and a reevaluation of Humphrey's chronology and the fluted point hypotheses is proposed. (44)

Schoeninger, Margaret (see Peebles, Christopher) (13)

Schwarz, Henry P. (McMaster) and André Debenath (Bordeaux) URANIUM-SERIES DATING OF NEANDERTHAL REMAINS FROM THE CAVE OF LA CHAISE DE VOUTHON, CHARENTE, FRANCE Travertine layers are intercalated between layers of clastic sediments containing stone artifacts and some cranial skeletal fragments. The travertines have been dated by measurement of the Th-230/U-234 ratio. Bed 11 of the abri Bourgeois-Delaunay has an age of 146,000 ± 16,000 years B.P. It immediately overlies the Neanderthaloid hominid remains of bed 12. Bed 53 in abri Suard, underlying the hominids, gives an age of 185,000 ± 30,000 years. (7)

Seaman, Tim (New Mexico) INTERNAL SITE STRUCTURE OF THE KAKINYA AND RULLAND SITES Analysis performed on archaeological data from two ethnographically documented Navamiut residential sites constitutes various demonstrations of internal or structural differentiations. The intent of this study is to explore new avenues of enquiry into the attributes of internal site organization and to understand the formation processes responsible for the observed patterning. The relations between site structure and components of site content are investigated through the analysis of samples defined on the basis of structural features on the sites and related to documented fall consumption and storage related behavior. The problem of recognition of generalized and specialized activity space is addressed, and analysis using variable sized grid unit summaries to control the precision or "grain" of structural information is performed. (33)

Servello, A. Frank and T. H. Bianchi (Southwestern Louisiana) SITE 16SA50: A TERMINAL PLEISTOCENE MULTI-COMPONENT SITE IN WEST CENTRAL LOUISIANA Site 16SA50, an in situ multiple-component site in west-central Louisiana, offers sound evidence for a Proto-Clovis/Clovis transition during the Terminal Pleistocene. The relationship of this site to others in the immediate area is discussed in general. The general and specific geomorphological setting is discussed. The result of various detailed analytical procedures provided insight into core reduction strategies and tool manufacturing processes. The results of the preliminary investigation of the pedology and sedimentology and the relation of geomorphic processes to the archaeology of the site are discussed. (29)

Servello, A. Frank (see Bianchi, T. H.) (39)

Servello, A. Frank (see Guderjan, Thomas H.) (12)

Shaw, Leslie and George C. Frison (Wyoming) EVIDENCE FOR PRE-CLOVIS IN THE BIGHORN BASIN A possible pre-Clovis occupation in the Bighorn Basin is suggested by lithic artifacts in association with a Pleistocene faunal assemblage from Little Canyon Creek Cave, Wyoming. The occupation level lies unconformably below a level dated at  $10,170 \pm 250$  (RL 641) years B.P. Support for pre-Clovis occupation comes from the combination of the stratigraphic context, unquestionable human tools, the unsophisticated lithic technology, and the faunal assemblage, which indicates an early postglacial environment. (45)

Shaw, Robert D. (U.S. Fish and Wildlife) JEWELS OF THE PERMAFROST: FROZEN WOOD AND ROTTEN LEATHER Excavation of an 8x1 m trench at site AK-MAR-007 on the Yukon-Kuskokwim Delta of southwestern Alaska exposed a stratigraphic sequence spanning the last 1,100 radiocarbon years. Throughout the midden, permafrost has preserved organic artifacts of Western Thule and Norton cultural traditions. Wood, leather, bone, and woven materials complement the normally recovered inorganic materials. Extreme stratigraphic detail is necessary to maximize the data provided by the excellent preservation. While most of the organics require minimum conservation procedures, postexcavation exfoliation of bone is a problem. (37)

Sheets, Payson D. (Colorado-Boulder) RECOVERY OF THE OBSIDIAN INDUSTRY FROM THE ILOPANGO VOLCANIC DISASTER Obsidian core-blade technology was established by 1200 B.C. in El Salvador, but it was disrupted by the Ilopango eruption for about two centuries. Industrial recovery in the Zapotitan Valley was effected with the recolonization and reestablishment of site-to-source access during the Classic Period. The basic industry is the same, but some procedures and products differ. Nonecologic factors explain the changes, for the changes reflect general Maya industrial developments rather than adaptive adjustments to changed circumstances in the disaster area. Recovery can be viewed in detail in terms of the seven kinds of settlement. (11)

Shelley, Phillip H. (New Mexico) SITE ENTRY "POSE" AND ITS IMPLICATION FOR CRAFT SPECIALIZATION: A CASE STUDY FROM SALMON RUIN, SAN JUAN COUNTY, NEW MEXICO Lithic data from the early thirteenth-century occupation of Salmon Ruin and from a lithic workshop site in the four corners area is used here to hypothesize certain aspects of lithic resource exploitation and social organization of some prehistoric Southwestern agriculturalists. Initial and secondary reduction steps of "Tchamajilla" manufacturing were being carried out at the resource outcrop, and the resultant tools were being transported to Salmon Ruin and other permanent habitation sites a considerable distance from the resource acquisition area in a "finished" or near-"finished" stage. Results based upon resource exploitation patterns and use parameters of "Tchamajilla" manufacturing and maintenance debitage support the generalized model that some "Tchamajillas" were being produced by a group of full- or part-time specialists. (14)

Shennan, Susan E. (Southampton, England) THE ROLE OF WOMEN IN EBA SLOVAKIA Mortuary data from Early Bronze Age Slovakia suggest a society with a limited degree of ranking; remarkably similar behavior patterns are apparent at all of the cemeteries studied. Estimates of community size indicate that all were extremely small scale, but within each there seems to be a group that was "richer" than any other by a variety of criteria. The members of this group were mostly female. The implications of this are considered, and an explanation is offered. (13)

Shields, Harvey M. (National Park Service) PREHISTORIC LAND USE PATTERNS IN THE WESTERN BROOKS RANGE Recent National Park Service archaeological surveys in the National Petroleum Reserve-Alaska, on the North Slope, have yielded almost 800 sites from four physiographic zones. The land-use patterns in two of these zones are compared by means of locational analysis. Howard Pass in the Brooks Range and the Storm Creek-Noluck Lake area at the headwaters of the Colville River are examined in light of three statistics: site density, nearest neighbor, and a hierarchical index. The results are discussed in relation to Alaskan prehistory and Campbell's model of Nunamiut settlement pattern. (44)

Shimada, Izumi (Princeton) BEHIND THE GOLDEN MASK: THE ARCHAEOLOGY OF BATAN GRANDE Batan Grande in the central La Leche Valley on the North Coast of Peru is known worldwide for the incredible beauty, variety, quantity, and technology of its looted funerary gold artifacts. The search for gold has not only resulted in extensive destruction but effectively "masked" the complexity and significance of prehistoric occupation. There are over 30 adobe pyramids and platforms representing massive material investment and complex cultural interaction since the preceramic period. Batan Grande holds the key to understanding the evolution of the Chimu Kingdom, the cultural significance of the Lambayeque Valley Complex, and the nature of Moche-Huari interaction. (46)

Short, Susan K. (INSTAAR) PRELIMINARY POLLEN STUDY, ZAPOTITAN BASIN, EL SALVADOR Soil samples from three archaeological sites in the Zapotitan Basin, west-central El Salvador, were recovered for pollen analysis to study one of the principal goals of the Protohistoric Project: to understand the basic processes underlying recovery from the Ilopango eruption. The samples can be arranged in a stratified sequence and include both pre-Ilopango and post-Ilopango samples. The results should serve as a base study of the changing vegetation patterns and vegetation recovery in response to the Ilopango eruption. The data will be compared with the basal spectrum of the Lake Cuscachapa diagram (Tsukada and Deevey 1967). (11)

Simmons, Alan H. (Arizona State Museum) FLOAT THE MODEL AND SINK THE DATA: POTENTIAL PROBLEMS WITH NON-DESTRUCTIVE RESOURCE EVALUATION RESPONSES Increased emphasis on nondestructive survey for evaluating cultural resources mandates that archaeologists refine minimal criteria for such evaluations. Emphasizing on-site data analysis may result in marginal data collections and lead to spurious conclusions. Since management decisions regarding further research are frequently determined by survey data, these data should be reliable. In many cases, surface collections and test excavations are necessary to determine significance. Concern is also expressed that traditional survey criteria used to define cultural activities may often be inaccurate. An example from Arizona is cited, singling out two cases of misrepresentative surface data involving pithouse identification and density estimates. (38)

Simmons, Alan H. (see Olszewski, Deborah) (8)

Smith, Carlyle S. (Kansas) THE NORTHWARD MOVEMENT OF THE ARIKARA IN SOUTH DAKOTA The northward movement of the Arikara up the Missouri River within historic times is projected back into prehistory graphically through the seriation of ceramic traits correlated with dendrochronology and the distribution of European trade items. (32)

Snarskis, Michael J. (Museo Nacional de Costa Rica) EXCAVATION OF AN EL BOSQUE PHASE HOUSE (A.D. 1-500) IN EASTERN COSTA RICA The excavation of the first prehistoric dwelling known for this time period in Costa Rica (and most of Central America) is described. In addition to subsistence data from the occupation level (metates, mortars, carbonized palm nuts), numerous tombs and caches containing ceramics, carved stone, and jade were found beneath the house. Its large size (roughly 30 x 15 m) and rectangular shape contrast with the circular houses of later prehistoric periods (A.D. 1000-1600) in eastern Costa Rica. (28)

Snavely, Alan N. and Cindy J. Parsons (Penn State) SIMULATING UNOBSERVED PARAMETERS IN SITE FORMATION The use of increasingly sophisticated analytic techniques in archaeological research imposes strenuous demands of rigor and sophistication upon both data and researcher. Computer simulation, which possesses the potentially powerful attributes of dynamism, visibility, and system/model control, has currently received praise as well as condemnation. These reactions to simulation in archaeological research are evaluated by a "logic-in-use" presentation of a real-world archaeological problem—the impact of forest growth upon intrasite artifact distribution and patterning. Methodological implications for simulations modeling, intrasite data collection, and behavioral interpretations emerge. (20)

Snow, Dean R. (SUNY-Albany) PUTTING LAB WORK IN ITS PLACE Papers dealing with the maintenance of field laboratories are introduced. The specific issues of lab strategy are addressed generally and in terms of specific procedures. It is noted that many of the operations once considered the ends of archaeological research are now regarded as means to ends. Consequently the field stages of data acquisition and primary processing must be considered preliminary steps. The changing role of the field director from that of a participant in excavation activities to that of a relatively remote administrator is also discussed. The rapid evolution of archaeological field research is also examined from the popular point of view and from the special perspectives of public and/or contract archaeology. (31)

Snyder, Sandy L. (see Ross, Richard R.) (24)

Southward, Judith A. (Colorado) A CLASSIC MAYA FARM HOUSEHOLD AND POLYCHROME CERAMICS Recent excavations near Ceren, El Salvador (1978), have revealed the presence of a Classic Maya farmhouse and adjacent cultivated fields. The excavations have also revealed substantial amounts of several varieties of polychrome ceramics, as well as a lump of hematite and hand-molded clay, in situ on the house floor. Previous Mesoamerican archaeology has tended to equate polychrome ceramics with the elite. Physical similarities between the raw materials and the polychrome ceramics are now being assessed by petrographic and geochemical analyses. If these analyses prove conclusive, it is suggested that prior notions concerning the role of status and its cultural manifestations in prehistoric Mesoamerica should be reevaluated. (11)

Spath, Carl D. (Illinois) POST-PLEISTOCENE COASTAL GEOMORPHOLOGY OF THE GUAYAS ESTUARY AND ITS SIGNIFICANCE TO ANDEAN CULTURE HISTORY The cultural implications of shifts in the coastal geomorphology and habitat of the Guayas Estuary during the Marine Transgression are discussed. The paper focuses on the maritime adaptation to expanding manglar and littoral resources referred to here as the El Encanto focus. It is argued that this not only was one of the earliest intensive post-Pleistocene adaptations in northwestern South America but was the basis of all long-distance maritime trade linking the cultural developments of Nuclear America. (40)

Spence, Michael (Western Ontario) and Jerome Kimberlin OBSIDIAN PROCUREMENT SYSTEMS OF TEOTIHUACAN, MEXICO The green obsidian quarries exploited by Teotihuacan lie 50 km northeast of the city. A sample of green obsidian cores from Teotihuacan workshops has been subjected to neutron activation and hydration analyses. The results shed some light on the nature of the procurement systems developed by Teotihuacan for the exploitation, transportation, and distribution of this important raw material. Both cores from major workshops and from small peripheral ones were analyzed. No significant differences were apparent in hydration dates; some distinct sources of green obsidian were identified, but they did not differ in their representation in the workshops. The implications of this for organization of the obsidian industry will be examined. (5)

Speth, John D. (Michigan) THE ROLE OF PLATFORM ANGLE AND CORE SIZE IN HARD-HAMMER PERCUSSION FLAKING A series of experiments are described in which steel balls are dropped on to massive equilateral and right-angle glass prisms in order to investigate the effects of varying platform angle and prism size on the shape and size of hard-hammer percussion flakes. The implications of the experimental results for studies of microwear formation on stone tools are discussed. (2)

Spickard, Lynda E. (Central Missouri State) NORTHWEST COAST RESOURCE ABUNDANCE; ETHNOGRAPHIC FACT OR PREHISTORIC FICTION? The ethnographic suggestion that Northwest Coast cultural development is attributable to the abundance of natural resources is examined from a time depth perspective. Abundance is defined in terms of nutritional quality of resources and tested against archaeological materials of Namu, B.C. The distribution of 91 faunal species through a 9,000-year sequence is evaluated against post-Pleistocene ecological reconstructions. (41)

Spurling, Brian E. (Simon Fraser) RESOURCE INVENTORY AND ASSESSMENT IN THE BOREAL FOREST This paper presents a field-tested methodology designed explicitly for inventory and assessment of cultural surface cover. The inventory aspect of this sampling strategy involves (1) the stratification of the study area, (2) the selection of random 500-m-a-side quadrats for each stratum, and (3) a subdivision of every quadrat into 100 equal sized subunits each of which receives examination by the placement of a 1 m x 1 m randomly selected test unit excavated until a C horizon or basal gravels are encountered. The assessment side of this sampling strategy is founded upon the same three principles. However, the size of the quadrat is reduced to 100 m per side, and the placement of quadrats is made non-randomly, i.e., the smaller quadrat (quadrito) is positioned over a known find spot. The output from quadrito excavation units informs upon the shape, volume, structure, and contents of individual cultural resources. Both strategies have been successfully employed over a two-year period in a watershed of northeastern British Columbia approximately 149 km<sup>2</sup> in area. To date approximately 12% of this region has been examined using the above techniques. (12)

Spurling, Geoffrey E. (Simon Fraser) OCCUPATIONAL SPECIALIZATION AND MATERIAL CULTURE With ethnoarchaeological data gathered from 10% of the households in a large Tzeltal municipio in the highlands of Chiapas, an analysis is carried out dealing with the effects of occupational specialization on material culture. Potters, weavers, carpenters, butchers, merchants, and *curanderos* are examined using statistical measures. Information on artifacts, activity areas,

storage, the intracommunity spatial distribution of specialists, and deposition is combined in a discussion aimed ultimately at aiding the interpretation of the archaeological record. (26)

Stafford, Barbara D. and C. Russell Stafford (Arizona State) A COMPARISON OF MACRO- AND MICROWEAR FUNCTIONAL ANALYSES OF LITHICS Functional analyses of lithic artifacts vary from the counting of "formalized types" with assumed functions to quantitative studies of kind and type of microdamage resultant from use. Three methods of lithic analyses will be discussed: (1) macrowear analysis according to a paradigmatic classification, (2) microwear analysis with low magnification, and (3) microwear under high magnification. A comparison will be made of the types of information obtainable from different scales of wear analysis, the precision of each method if similar information is obtained, and the cost involved as measured by efficiency. A data base from east-central Arizona will be used to test these methods. (38)

Stafford, C. Russell (see Stafford, Barbara D.) (38)

Stahle, David (see Wolfman, Daniel) (7)

Stamps, Richard B. (Oakland) NEW EXAMPLES OF PERFORATED CRANIA IN SOUTHEASTERN MICHIGAN Salvage excavations north of Detroit, Michigan, brought to light two new examples of post mortem skull manipulation, with associated modification of femurs and humeri. This paper describes the remains and places them in a time-space context. (29)

Stanford, Dennis J. and J. Albanese (Smithsonian) THE DUTTON AND SELBY SITES, COLORADO; EVIDENCE FOR PRE-CLOVIS OCCUPATION OF THE HIGH PLAINS Excavations at the Dutton and Selby sites in northeastern Colorado have produced mammoth, horse, camel, sloth, and bison bones that appear to have been butchered by man. These remains were found in association with possible bone tools and chert flakes, in three distinct geologic units below a Clovis age occupation level. Geologic correlation indicates that the earliest deposition of faunal remains at these sites may be in excess of 17,000 years old. (45)

Stark, Barbara L. (Arizona State) ANALYSIS OF PRODUCTION IN CERAMICS: A VERACRUZ EXAMPLE This paper addresses two topics concerning pottery production: means to identify production from stratigraphic evidence at habitation mounds and means to identify the social organization of production using ceramics from stratigraphic collections. In part, the analysis will use ethnoarchaeological data from craft production in Tlacotalpan, Veracruz. In the archaeological case example from Patarata 52 in Veracruz, a combination of criteria is used to evaluate production. Paste and formal attributes are the basis for analysis of standardization in pottery types and varieties. Standardization is presumed to relate closely to specialization, with some qualifications. (14)

Steen-McIntyre, Virginia (Colorado State) and William J. Hart (Museo de Historia Natural de El Salvador) TIERRA BLANCA TEPHRA: A 1700 YEAR OLD STRATIGRAPHIC MARKER HORIZON FOR MESOAMERICA Approximately A.D. 300, a series of devastating volcanic eruptions buried much of El Salvador under a thick blanket of ash. Measurements of thickness and particle size show that the bulk of the tephra fell north and west of the source vent, located on the north shore of Lago Ilopango. The ash blanket is still 50 cm thick 75 km from its source. It is conceivable that it occurs as a recognizable unit as far away as southern Mexico. Chemical and petrographic data are used to "fingerprint" the tephra so that it can be identified when it occurs in archaeological sites. (11)

Stein, Julie (Minnesota) GEOLOGIC ANALYSIS OF THE GREEN RIVER SHELL MIDDENS During the Pleistocene, outwash transported by the Ohio River dammed the water draining west-central Kentucky, creating a lake. The resulting lake beds constitute what is now the Green River floodplain. Restricted movement of the river channel within these massive clay deposits favored the preservation of the shell middens. The midden's relationship to the floodplain is complex yet discernible because of the lack of floodwater erosion or deposition. Samples collected were analyzed for pH, phosphorus, organic carbon, clay mineralogy, and grain-size distribution in order to define the roles of both natural and cultural formation processes operating during deposition of the sites. (16)

Steinen, Karl T. (West Georgia) LAND UTILIZATION AND SITE DISTRIBUTION IN THE SOUTH APALACHIAN PROVINCE: THE WEST GEORGIA PIEDMONT Archaeological survey of three transmission rights-of-way on a 4,000-acre plant site have disclosed aspects of site distribution and land utilization in the West Georgia piedmont that have hitherto been unrecognized. Sites located through stratified random sampling are statistically treated to allow for a discussion of their internal variability. Relationships of sites to five topographic variables are discussed in relation to a model of land utilization developed from ethnohistoric records. (29)

Steponaitis, Vincas (see Peebles, Christopher) (13)

Sterud, Eugene L. (Archaeological Institute of America) THE ANATOMY OF ARCHAEOLOGICAL INNOVATION The use of bibliographic citations provides a basis for studying the development of American archaeology. Analysis of bibliographical references in *American Antiquity* from 1946 through 1978 clarifies and demonstrates changing trends in archaeological research and makes explicit the marked increase in works emphasizing a processual orientation. The "life-cycle" of the published work is illustrated. Citation networks, constructed through the coupling of co-cited works and the development of these patterned data, results in a modeling of the intellectual structure of a developing idea. Such networks can serve as indicators of specializations within a discipline, clarify changing relationships between and within specialties, and point to new research directions within the discipline. (19)

Sterud, Eugene (see Clymer, Mark) (47)

Stone, Charles (see Early, Ann M.) (32)

Stone, Jane (SUNY-Binghamton) THE SOCI-ECONOMIC IMPLICATIONS OF LITHIC EVIDENCE FROM HUARI, PERU Lithic materials from the preindustrial urban center of Huari in central Peru, collected by the Huari Archaeological Project, 1977, are summarized. Lithic technology and raw material utilization have been analyzed in both temporal and spatial frameworks, and the relevance of these data for understanding differential activity areas and occupational specialization within the site of Huari and for tracing trade networks within the Huari state are discussed. (5)

Strauss, Lawrence G. and Geoffrey A. Clark (New Mexico) PALEOECOLOGY AT LA RIERA CAVE, ASTURIAS, SPAIN Recent results of the analysis of data collected at the Upper Paleolithic-Mesolithic site of La Riera are discussed. These include studies of artifact assemblage, raw material, and fauna. Certain stratified evidence contradicts normative characterizations of the Solutrean and Magdalenian and suggests the primacy of functional explanations for the variability observed. In addition, preliminary evidence of major climatic and vegetational changes, and of seasonal use of the site, are outlined. Indications of increasing reliance on marine resources throughout the sequence of levels are discussed in light of current theory on changes in human subsistence toward the end of the Pleistocene. (23)

Stuckenrath, R. (see Ackerman, R. E.) (34)

Stutzman, Esther (see Ross, Richard E.) (39)

Thompson, Gail (Washington) PREHISTORIC SUBSISTENCE-SETTLEMENT CHANGES IN THE SOUTHERN NORTHWEST COAST Settlement patterns recently defined by the author for the Locarno Beach, Marpoles, and Gulf of Georgia archaeological cultures seem to reflect changes in subsistence emphasis through time. An early generalized subsistence system gave way to the specialized exploitation of salmon. Settlement patterns changed from a single-part wandering pattern during Locarno Beach, through a two-part Marpole seasonal pattern, to a several-part Gulf of Georgia seasonal round pattern. The last two patterns showed more efficient exploitation of salmon than the Locarno Beach pattern. (43)

Thompson, Gail (see Robinson, Stephen W.) (7)

Thoms, Alston V. (Technology Research & Development) CULTURAL RESOURCE CONTRACTS AND ENVIRONMENTAL CONSULTING FIRMS: AN OKLAHOMA EXAMPLE Technology Research & Development, Inc. (TECHRAD), an Oklahoma City-based environmental consulting firm, recently hired an archaeologist. The position was established following suggestions by several federal and state agencies. TECHRAD, as a division of a nationwide architectural and engineering firm, becomes involved in projects at the earliest possible time. The interdisciplinary nature of the organization provides an excellent framework for assessing a project's impact on cultural resources early in the planning stage. TECHRAD's development of its Cultural Resources Discipline is emphasized, as are the difficulties and benefits of conducting contract archaeology under the auspices of an environmental consulting firm. (41)

Thoms, Alston V. (see Jurgens, Christopher J.) (40)

Titus, Larry (Simon Fraser) THE PROBLEMS AND POTENTIAL OF A WATERLOGGED AND FROZEN THULE SITE ON HERSHEL ISLAND, YUKON TERRITORY The Washout Site (NjVi-2), consisting of at least three known houses of Thule manifestation, has yielded large amounts of waterlogged, frozen, and oil-soaked organic materials. The identification and analysis of macro-

and microflora and fauna and the possible chemical analysis of hides and tissue are only a few of the sources of information available. Through these our reconstruction and processual interpretation of Thule life—subsistence, economy, settlement patterns, and even social and religious systems—may be set on a firmer basis. Despite the problems inherent in waterlogged and frozen sites, the great potential that they possess will allow us, literally, to flesh out the archaeological record. (37)

Tosi, Maurizio (Wellesley) THE MARXIAN CONCEPT OF *PRODUKTIONSKRAFTE* AND THE ARCHAEOLOGICAL EVIDENCE FOR CRAFT SPECIALIZATION IN THE PROTOHISTORIC SOCIETIES OF EASTERN IRAN AND THE INDUS VALLEY (ca. 300-1800 B.C.) Excavations of several third millennium sites in eastern Iran have provided evidence of specialized production areas. These areas of specialized activity are described and discussed in terms of the Marxian concept of *Produktionskrafte*. The role of craft specialization in the development of eastern Iranian complex societies is evaluated. (14)

Treat, Patricia A. (see Metcalf, Michael D.) (41)

Trigger, Bruce (McGill) ARCHAEOLOGY AND THE AMERICAN INDIAN Archaeologists have treated the American Native Peoples in a detached and somewhat pejorative fashion. For an explanation, the development of American archaeology will be considered in relation to the changing views of Native Peoples that archaeologists have held. In the nineteenth century, Native Peoples were regarded as unprogressive savages, a view reflected in the "Mound Builder" myth, which held the earthworks to be the work of non-Indians. In the first half of the twentieth century, there was even less concern with Native Peoples, coinciding with declining interest in functional interpretation of archaeological data and loosening of ties with ethnography. The New Archaeology continues to treat prehistoric Native Peoples as objects rather than subjects of research. (19)

Trombold, Charles Dickson (Illinois) TOWARD AN EMPIRICAL DELINEATION OF SETTLEMENT HIERARCHIES IN COMPLEX SOCIETIES This paper explores a methodological framework to enable the ethnographer and/or the archaeologist to delimit a settlement's hierarchical order on the basis of functional content alone, specifically on the order of entry or threshold of any given economic function. This framework involves the almost perfect congruence of Guttman scaling to both Christaller's conditional order of entry principle and Losch's area-serving principle in terms of differential allocation of incremental functions. In addition, the Guttman technique may be of great value in studying individual site-functions in terms of their relationship to population aggregates. (46)

Turnbaugh, William A. (Rhode Island) CALUMET CEREMONIALISM AS A NATIVISTIC RESPONSE This paper archaeologically and ethnohistorically delineates the expansive Historic-period career of the calumet and the parallel development of related tobacco pipe usage. It briefly reviews both pipes and calumets, indicates their changing associations and significance, and considers a rapid postcontact diffusion of certain aspects of their use. Finally, a case study drawn from seventeenth-century documentation is used in conjunction with Wallace's discussion of revitalization movements to support the contention that extensive calumet ceremonialism noted by early commentators may reflect a nativistic response to widespread sociocultural fragmentation that occurred after the arrival of Euro-Americans. (32)

Upham, Steadman (Arizona State) PERIPHERAL MARKETS IN THE 14TH CENTURY PLATEAU SOUTHWEST An interaction sphere centering around the Little Colorado River and its tributaries is proposed for the fourteenth-century Plateau Southwest. It is argued that the widespread exchange of turquoise, shell, lithic raw material, ceramics, and, to a certain extent, food was facilitated by the development of a peripheral market economy. Ecological diversity within the interaction zone is viewed as a positive force in the development of panregional exchange. Regional settlement data are examined, and a structural model of the interaction network is presented. A hierarchical relationship between sites involved in the interaction sphere is suggested. (21)

Upham, Steadman (see Hantman, Jeffrey L.) (14)

Vehik, Susan C. (see Buehler, Kent J.) (50)

Wickers, Roger S. (SRI International) THE USE OF RADAR IN ARCHAEOLOGY—THE TECHNICAL ASPECTS Subsurface sounding radar systems have been used in recent years in conjunction with other surface-based equipment in surveys to detect buried archaeological materials and structures. The technique, though capable of providing dramatic results in some cases, is strongly affected by the local soil properties and those of the targets. The use of ancillary techniques in



conjunction with radar can assist in predicting and interpreting the radar results. Typical surveys in which magnetometry, resistivity, and subsurface acoustics and radar have been used are described in the paper. The advantages and limitations of each are discussed. (6)

Vierra, Robert K. (Northwestern) DIFFERENCES IN RESOURCE SELECTION STRATEGIES AND THE USE OF ROCK SHELTERS IN THE AYACUCHO VALLEY, PERU. The analysis of the subsistence remains from two deeply stratified rock-shelter sites in the Ayacucho Valley, Peru, suggests that the occupants of these sites were practicing different resource-selection strategies. One site indicates that the occupants were dependent on small mammals and most probably plants while the other site in a different environment has remains of mostly cervids and camelids. It is suggested that these different strategies relate to seasonal differences and that, for the Andean environment in general, rock-shelter occupations are more apt to be seasonally specific locations. (1)

Vierra, R. K. (see Brown, J. A.) (15)

Von Endt, David W. (see Oliver, James S.) (25)

Voorhies, Barbara (UC-Santa Barbara) LOCATIONAL ANALYSIS OF PREHISTORIC SETTLEMENTS IN A PORTION OF THE COASTAL HUMID TROPICS, CHIAPAS, MEXICO The present paper reports progress on a study of prehistoric settlement locations within a bounded area (875 km<sup>2</sup>) of the coast of Chiapas, Mexico. Prehistoric settlements within the study area range in age from late in the Archaic Period to the Late Postclassic Period. The dual objectives of the present paper are to describe the distribution of sites by occupational period and to infer the processes of settlement location responsible for them. The method of analysis is to apply various locational models to the observed settlement patterns in order to test for goodness of fit. Based in part on these findings, explanations for the observed patterns will be offered. (9)

Vreeland, James M., Jr. (Texas) SPECIALIZED AND NON-DOMESTIC FABRIC PRODUCTION IN HIGHLAND PERU: A PREHISPANIC CONTINUITY Recent ethnographic studies in a highland community of southern Peru have indicated that craftsmen employing specialized weaving equipment not found in households still produce fine quality fabrics for ritual and other nondomestic functions. Both oral traditions and linguistic information suggest that this art and technology existed in Inca and probably earlier periods. Empirical observations of looms and loom parts and the presence of high-quality early historic textile fragments recovered from village churches further establish the close ties between present-day weaving technology and function and those of the Inca period. The importance of the fabric-making tradition in a nondomestic context and the derivative nature of its relationship with pre-Hispanic production systems are discussed. (14)

Wagner, Gail E. (Washington-St. Louis) THE GREEN RIVER ARCHAIC: A BOTANICAL RECONSTRUCTION Landform, climate, vegetation, and man maintain a dynamic interrelationship that dictates the vegetation of any given region over any given period of time. Reconstruction of the former Big Bend vegetation is basic to understanding Archaic cultural adaptations and subsistence systems along the Green River. We can develop a model of these Archaic plant-man interrelationships based upon the environmental reconstruction and the results of the subsistence analysis. This model, in conjunction with plant remain sequences from other Archaic sites in the Midwest, provides a fresh viewpoint from which we may reexamine the validity of previous Archaic subsistence models. (16)

Walker, Danny N. and George C. Frison (Wyoming) THE CONTINUAL DOMESTICATION OF WOLF/DOG HYBRIDS ON THE NORTHWESTERN PLAINS Discriminant function analysis has become an invaluable statistical tool in the taxonomic identification of hybrids between the various species of *Canis* in the Eastern United States. This technique has recently been applied to *Canis* skulls from several Wyoming archaeological sites. It appears that most canid remains originally identified as wolf (*Canis lupus*) are actually wolf/dog hybrids with a constant and continual deliberate backbreeding to the local wolf population. (25)

Walker-Yorga, Brian (see Janes, Robert R.) (37)

Wallace, Henry D. (Museo Nacional de Costa Rica) A LATE MIDDLE POLYCHROME (A.D. 100-2000) BURIAL FROM THE SITE OF NACASCOLO, BAHIA CULEBRA, COSTA RICA A primary extended burial with multiple secondary interments from site 30471-9, Nacascolo, is described and analyzed in terms of ages, sexes, and skeletal pathologies of the individuals represented. Comparisons of skeletal pathologies are made with two other Guanacaste sites for which material is available. Funerary customs represented in the Nacascolo burial are compared with those of 14 sites within the Greater Nicoya Archaeological Subarea that have usable burial information in order to arrive at a preliminary areal and chronological perspective for the burial. (28)

Walsh, Michael R. (UCLA) A TECHNIQUE FOR PREDICTING VESSEL VOLUME USING SHERD DATA Previous attempts to predict vessel volume using potsherds are briefly discussed, and their limitations are explained. Several critical variables have been measured on whole corrugated vessels from the Pajarito Plateau area in north-central New Mexico and Coyote Creek OI, a pueblo in Arizona. These variables were chosen on the basis of their being feasibly measured on individual potsherds. Univariate and multivariate regression analysis has shown which of these variables co-vary with volume. Methods of measuring these variables using potsherds are discussed, and arguments as to why these variables should be volume-sensitive are presented. (22)

Washburn, Dorothy K. and R. G. Matson (California Academy of Sciences) USE OF MULTIDIMENSIONAL SCALING TO DISPLAY SENSITIVITY OF STRUCTURAL PATTERN ANALYSIS TO SPATIAL AND CHRONOLOGICAL CHANGE Multidimensional scaling was used to clarify the sensitivity of design patterns and structures to temporal and spatial change. Scaling of relative frequencies of design structures from five localities in the Four Corners area produced a map that, in effect, accurately reproduced the actual locations of these collection areas in space. Relative frequencies of designs from within a locality can produce similar maps on contemporaneous design data, as well as produce a perfect horseshoe-shaped seriation curve, correctly arranging seven sites on the Mesa Verde in temporal order. (22)

Watson, Patty Jo (see Marquardt, William H.) (16)

Weakly, Ward F. (Bureau of Reclamation, Denver) ETHICS AND THE ARCHAEOLOGICAL CONTRACTOR The question of ethics in archaeology has received considerable discussion within the profession for a long time. Most recently there has been a flurry of such discussion plus the promulgation of various codes of ethics by professional organizations. Unfortunately little attention has been paid to the questions and issues of an ethical nature that come to the attention of, and are of concern to, contracting entities. An analysis by examining actual cases stresses the need for input into codes of ethics of the concerns of contracting entities. (17)

Weaver, Donald E., Jr. (Museum of Northern Arizona) ECONOMIZING, AN EXPLANATION FOR ANASAZI ABANDONMENT The similarities and complementary aspects of ecology and economics provided the framework for a regional model for Anasazi abandonment of large areas of the Southwest in the fourteenth century. Economizing, the allocation of scarce resources among alternative ends, was postulated as the primary process that resulted in irreversible cultural developments culminating in regional abandonment. The theoretical model was tested using data from Manuelita Canyon in northwestern New Mexico. The results substantiated the model, and it was concluded that resource scarcity and human population economizing efforts were probably the primary factors leading to the abandonment of Manuelita Canyon. (48)

Weaver, Martin (see Janes, Robert R.) (37)

Webster, David L. (Penn State) THREE WALLED CENTERS OF THE NORTHERN MAYA LOWLANDS Three walled sites of the northern Maya Lowlands, Cuca, Chacchob, and Dzonot Aké, provide insights into the organization, functions, and patterns of development of small Maya centers. The prehistoric boundary systems associated with these sites—probably all fortifications—help resolve the traditional problem of the spatial definition of Maya centers, which characteristically lack tight nucleation, because they represent "emic" decisions concerning the definition of space made by the Maya themselves. All the sites appear to have functioned primarily as elite residential centers with associated temple complexes, but their internal configurations are strikingly different and reflect three distinctive settlement histories. (9)

Wier, Glendon H. (see Bryant, Vaughn M.) (1)

Weymouth, John W. (Nebraska) PROTON MAGNETOMETER SURVEY OF THE YAGI SITE A magnetometer survey with one reference and one grid magnetometer was carried out on a one-meter grid over 0.56 hectares on the Yagi site. This survey was concurrent with and adjacent to the excavations being conducted; so no immediate verification was possible. Magnetic susceptibility measurements on soil samples indicate possible high magnetic contrast of features. Model calculations simulating typical Jomon houses are being used as a guide in interpreting the magnetic contour maps. Four or five regions are identified as potential activity areas. This information will be used in the next season's testing. (36)

Whalen, Michael E. (Tulsa) A COMPARATIVE EVALUATION OF PITHOUSE AND PUEBLO SUBSISTENCE SYSTEMS IN SOUTH-CENTRAL NEW MEXICO All existing archaeological data from a 14,000-square-mile area of south-central New Mexico are used to characterize and compare Pithouse and Pueblo subsistence systems between ca. B.C./A.D. and A.D. 1400. Pithouse period

subsistence systems are characterized as extensive, broad-spectrum, stable, but low-productivity enterprises, while their Pueblo successors are seen as more intensive, more specialized, of higher productivity, but lacking in stability. Factors motivating transition from one alternative to the other are poorly understood, but a model is suggested. (48)

Whalen, Norman M. (Southwest Texas State) **ARCHAEOLOGICAL SURVEY BETWEEN THE WILCOX PLAYA AND DOS CABEZAS MOUNTAINS OF ARIZONA** The first step of an archaeological survey was initiated in the 60-square-mile area between the desiccated Willcox Playa and Dos Cabezas mountains of southeastern Arizona during the summer months of 1978. By the use of interval transects placed diagonally across 40 surveyed sections, 56 prehistoric sites were discovered. Distribution of sites was denser in higher elevations than near the playa. By the use of discriminant analysis, correlation between activity and environment is clearly postulated. Data from this survey will structure the second step, scheduled for 1979, when 1/4-square-mile quadrats will be examined to find interrelationships, activities, and attributes of sites.

Whallon, Robert (Michigan) **MULTILEVEL CLUSTERING** This paper is a technical contribution in which it is argued that the models upon which all standard or common methods of cluster analysis operate are consistent with at least the majority of our archaeological models of groups or clusters. This is true whether one is speaking of typology or of spatial analysis. Simple analytical procedures are developed that alleviate these problems, and examples are presented of their use in spatial analysis. (33)

White, Joyce C. and Chester F. Gorman (Pennsylvania) **PATTERNS IN "AMORPHOUS" INDUSTRIES: THE HOABINHIAN VIEWED THROUGH A LITHIC REDUCTION SEQUENCE** A Hoabinhian lithic assemblage from Steep Cliff Cave (ca. 5500-3500 B.C.), northwest Thailand, is described and analyzed through a lithic reduction framework. It is proposed that this, and perhaps other, "amorphous" assemblages are characterized by systematic unifacial curating of unifacially worked cobble tools. Supporting data are presented through a statistical analysis recorded on debitage. The analysis demonstrates that assemblages or parts of assemblages that lack formalized types can still yield important technological, archaeological, and anthropological information. (42)

Whitcotton, Stephen (Southern Illinois) **EFFICIENT MANAGEMENT IN CONSERVATION ARCHAEOLOGY PROJECTS** Viewing archaeological inquiry in the conservation context as a problem of management is an efficient strategy. Given the large sums of money handled, the numbers of personnel directed, and the magnitude of logistics required, the principles of management as employed by business firms are desirable and necessary. Archaeologists dealing with conservation projects are held accountable to taxpayers, employees of the project, and the sponsoring firms or agencies for the quality of their research. The utilization of proven management principles will not preclude high-quality research but, with strategic application, will always assist the process of realizing archaeological and bureaucratic goals. (39)

Whittaker, John C. and Harold L. Dibble (Arizona) **SYSTEMATIC ASPECTS OF PERCUSSION FLAKING: EVIDENCE FROM CONTROLLED EXPERIMENTS** This paper presents the results of some controlled experiments in direct percussion flaking, focusing on relationships between independent variables of production and variable characteristics of the resulting flakes. Several systematic relationships were observed. Results suggest the possibility of reconstructing some of the variables of production from observable characteristics of flakes. In turn, this should allow the reconstruction of basic patterns of flake production characterizing the manufacture of a given lithic assemblage. (42)

Wiant, Michael (Northwestern) **THE ANALYSIS OF ARCHAEOLOGICAL FEATURES** Published analyses of archaeological features are seriously limited for two reasons: (1) features are viewed as distinct artifact types and analyzed without due consideration for their contextual relationship to the remainder of the archaeological record, and (2) analogic means are directly applied to interpret their meaning in a functional behavioral sense. An alternative approach is offered here, which includes (1) the examination of features in their contextual setting and (2) the use of analogy as a method for deriving propositions about feature interpretation as opposed to an explanatory element. (15)

Wiersum, Wayne E. (HEW, Alaska) **OUTHOUSE ARCHAEOLOGY** The IHS in Alaska is now in the process of a massive construction program modernizing the water and sewage systems in all Native villages. Many if not most contemporary villages are located either on or near significant archaeological and historic sites. This paper will focus on a discussion of the archaeological and engineering/construction interface in relation to the cultural resources. (41)

Willcox, U. Vincent (Smithsonian) **COMPUTERIZED COLLECTIONS MANAGEMENT** The computer is being used with varying degrees of success in providing for improved accessibility to collection records and documentation. However, its potential as a tool for solving basic collections management problems, such as storage and conservation, has not been fully realized. The computerized inventory of the anthropology collections at the Smithsonian is an example of the use of the computer for quantifying collections management data for the purpose of planning new storage facilities and new programs of collection maintenance and conservation. (31)

Willcox, Larry R. (see Glassow, Michael A.) (24)

Wilde, James D. (Oregon) **NORTHERN GREAT BASIN SEDENTARISM: A PRELIMINARY REEVALUATION OF CATLOW AND ROARING SPRINGS CAVES IN SOUTHEASTERN OREGON** Cave sites in the Great Basin have been viewed as representative of Shoshonean Cave-like subsistence patterns. This model characterized cave sites as loci for short-term seasonal habitations for exploiting a nearby resource as part of a subsistence round. Recent studies have suggested that this model does not adequately account for artifact and resource diversity or for adaptations to relatively rich local environments. A new model is proposed that suggests that some cave sites represent semi-permanent occupations in resource-centralized locations. An "activity-set" method of testing this model is attempted using data gathered from Catlow and Roaring Springs Caves. (40)

Widese, Leslie E. (U.S. Forest Service) **GETTING US ALL TOGETHER: CULTURAL RESOURCE CONTRACTING IN THE PACIFIC NORTHWEST** Government contracting with out-service cultural resource specialists has apparently been more successful in the Pacific Northwest than elsewhere. Quality and appropriateness of proposals and end products have improved steadily, as agency and nonagency scholars gain experience with the objectives of CRM and the workings of the federal procurement system. Meetings, workshops, newsletters, personnel exchange, prework and contract administration conferences, detailed specialist and management review of contract reports, and other formal and informal communication strategies have helped "the system" to function smoothly, have promoted mutual understanding in the CRM community, and have defused personality skirmishes and other frustrations of contracting. (17)

Wilk, Richard (see Kosakowsky, Laura J.) (10)

Wilke, Steve (Washington-Seattle) **PREHISTORIC CULTURAL RESPONSE TO ENVIRONMENTAL CHANGE IN THE UPPER CHESAPEAKE BAY AREA** The "siteless survey" method was recently utilized to gather data to study prehistoric land use in the upper Chesapeake Bay area. Analytic units were defined on the basic mapped artifact densities. Artifact functional and stylistic analyses were utilized to define settlement types. The additional temporal information permitted examination of changes in landscape utilization over time and across space. Explicit consideration was given to low-density artifact concentrations as well as utilization represented by widely spaced artifacts. Results indicate that Woodland peoples abandoned the study area as a cultural response to degradation of key coastal environments. (24)

Willey, Patrick S. (see Emerson, Thomas E.) (32)

Williams-Dean, Glenna (see Lindsay, Alexander J.) (31)

Willis, Raymond F. (see Purdy, Barbara A.) (37)

Wilson, Bart (Environment Consultants) **EXCAVATION OF A HISTORIC STRUCTURE AT THE CLAH-CLEH-LAH VILLAGE SITE (45-SA-11), NORTH BONNEVILLE, WASHINGTON** In July 1978 the first fully historic structure was encountered at the Clah-cleh-lah village site. It was a one-room structure that burned while occupied. Artifacts recovered date the structure between the late 1850s and the late 1860s. A photograph of the house taken in 1867 by C. E. Watkins confirms this date. Activity areas within the house are defined, and the structure's relationship with the rest of the site is determined. The artifacts recovered from the house are compared with those from other historic sites such as Fort Vancouver to determine similarities and differences in type and frequency. (3)

Wing, Elizabeth S. (Florida) **PREHISTORIC USE OF THE ANDEAN REGIONAL FAUNA** Human use of animals in the Andes is unique. Much attention has been focused on one aspect of this uniqueness, the domestication of mammals. In this paper, I will outline the selection of wild species in the Andean fauna as indicated in the faunal samples from sites in the Ayacucho Valley compared with sites both south and north from Ayacucho. The character of the faunal assemblages is typical of inland sites, with indications of dependence on a cervid, a rabbit-like mammal, and a

ground-dwelling herbivorous bird. In the Ayacucho sites deer, viscacha, tinamou, and pigeons fill these roles and make up the bulk of the wild animals used. (1)

Winter, F. A. (see Bankoff, H. A.) (49)

Wobst, H. Martin (Massachusetts-Amherst) SQUARE ANSWERS FROM MISCELLANEOUS HOLES: EXPERIMENTS IN SUBSURFACE SAMPLING Presently the results from the subsurface sampling for archaeological features are not robust. The size, shape, orientation, and distribution of sampling units significantly affect the chance of encountering features of different size, shape, distribution, and visibility. The paper retrodicts some of the literature, with the help of trigonometry and calculus, and suggests ways to produce subsurface survey results that are replicable, comparable across surveys, less costly than heretofore, and robust given the hypotheses that the surveys evaluate. (2)

Wolfman, Daniel and David Stahle (Arkansas Archeological Survey) RECENT ADVANCES AND RESULTS IN ALPHA TRACK DATING Alpha particles that are emitted and nuclei that recoil during the alpha decay of uranium-238, uranium-235, thorium-232, and the isotopes in their decay chains damage mica to form what are called alpha and alpha-recoil tracks. The tracks can be sufficiently enlarged by etching to be seen using a Nomarski differential interference-contrast microscope. Since these tracks are usually erased during firing, micaceous pottery can be dated by determining the track density and the uranium and thorium concentrations or alpha activity in the mica. History of the development, recent advances, the latest results, and future potential of this dating method will be discussed. (7)

Wolfman, Daniel (see Early, Ann M.) (32)

Wolynec, Renata B. (Edinboro State) A FEATURE DOESN'T HAVE TO DO ANYTHING—FEATURE INTERPRETATIONS THROUGH THE APPLICATION OF INTERPRETIVE MODELS Although archaeological features are commonly defined and excavated in the field, they are rarely subjected to rigorous analysis as nonportable cultural artifacts. This lack of rigor is especially apparent during the interpretive phases of analysis. Feature interpretation usually directs itself to answering the question, "What did this feature do?" and not the more appropriate question, "What kinds of human and nonhuman behaviors contributed to the organization of remains that have been excavated as an archaeological feature population?" This paper will discuss the generation of models developed from ethnographic and physical process data in order to answer the latter question. (12)

Woosley, Anne I. (Southern Methodist) AGRICULTURAL DIVERSITY IN THE SOUTHWEST The term *agriculture* frequently resembles an almost taxonomic attempt to define a particular type of economy. Agriculturalists within various broad geographical contexts are viewed as fairly homogeneous populations engaging in similar subsistence activities. In the American Southwest, this homogeneity involves the cultivation of major food crops such as corn, beans, and squash. The labor expended in the successful procurement, propagation, and preparation of these crops assumes certain forms described as characteristic of southwestern farmers. This generic interpretation fails to consider (1) the extent to which agriculture was a significant component of the overall economy and (2) the possible variation in southwestern agricultural practices even in contiguous areas. Using archaeological data from Arizona, New Mexico, and Colorado, these problems will be discussed. (48)

Workman, Karen Wood (see Workman, William B.) (44)

Workman, William B. (Alaska-Anchorage), John Lobdell (Anchorage Community), and Karen Wood Workman RECENT ARCHEOLOGICAL WORK IN KACHEMAK BAY, GULF OF ALASKA Excavations since 1974 have built upon de Laguna's pioneering (1934) periodization of Pacific Eskimo prehistory. Work on Chugachik Island yielded abundant artifactual and paleoenvironmental information dated ca. 350 B.C.-250 A.D. While artifacts were scarce at Cottonwood Creek, rich data on human biology, paleopathology, social stratification, and mortuary ceremonialism were recovered. Excavations at the Yukon Island Fox Farm filled a late prehistoric gap in the sequence, revealing a new culture with connections with the Alaska Peninsula. Future research must focus on the earlier prehistory of the bay, the classic problem of the Pacific Eskimo-Tainaina Athapaskan transition, and the paleoenvironmental record. (44)

Yarborough, Michael R. (U.S. Fish and Wildlife Service) A SITE ON EVERY FLAT SPOT Data collected from Kodiak National Wildlife Refuge during the 1977 and 1978 field seasons permit a discussion of the relationships between site placement and coastal morphology. An attempt is made to determine what effect such factors as shore profile, exposure, potential for resources,

and defense characteristics have had on past selection of known site locations. The Kodiak results are compared to a similar study from the Aleutian Islands, and a model for prediction of site incidence in coastal Southwest Alaska is proposed. (44)

Yellen, John E. (see Brooks, Alison) (33)

Yerkes, Richard (Environment Consultants) CHINOOK HOUSES AND HOUSELIFE: SEMISUB-TERRANEAN PLANK HOUSES AT THE CLAH-CLEL-LAH SITE (45-SA-11), NORTH BONNEVILLE, WASHINGTON Excavations conducted by Environment Consultants, under contract with the U.S. Army Corps of Engineers, have revealed the depressions of several semisubterranean plank houses at 45-SA-11. The formal features of these excavated plank houses and the material from their fills are examined and compared with ethnographic descriptions of Chinook plank houses. The results of these studies are used to discuss the adaptations of the native inhabitants of this village during the period of culture contact with Anglo-Americans. (3)

Yerkes, Richard (see MacDonald, John) (3)

Yesner, David R. (Southern Maine) HUMAN BIOGEOGRAPHY AND INSULAR ADAPTATION IN THE CASCO BAY REGION, SOUTHWESTERN MAINE Maritime hunter-gatherers in New World insular settings have developed effective exploitation of both intertidal and offshore resources. Establishing the nature of prehistoric settlement patterns in insular settings depends upon (1) reconstructing prehistoric shorelines to determine their position and coastal gradient; (2) estimating the biomass of intertidal resources available; (3) evaluating areas as rookeries for sea mammals and birds; (4) assessing the location and concentration of upwelling zones; and (5) determining the degree to which other resources might serve as population buffers. In archipelagos with smaller islands, such as the Casco Bay region of southwestern Maine, semisedentary settlement patterns were the rule. Effective exploitation of such archipelagos relied on fragmentation into microbands. In such a situation, the degree of sedentism possible depended on local trade patterns and food storage techniques. For this reason, the island area-population size correlations of island biogeographers cannot be strictly applied to such systems. (24)

Yoshizaki, Masakazu (see Bleed, Peter) (36)

Yoshizaki, Masakazu (see Hurley, William M.) (36)

Zier, Anne H. (Colorado) THE 1978 PROTOCLASSIC PROJECT GROUND STONE AND ITS PLACE IN A POST-ERUPTIVE ECONOMY The 1978 Protoclassic Project recovered a total of 137 ground stone artifacts, including 14 (10%) from the Ceren site, 27 (20%) from the Cambio site, 89 (65%) from the Zapotitan Valley survey, and 7 (5%) from the Ceren survey. Analysis was oriented toward study of both morphology and utilization, the latter involving wear pattern analysis and ethnographic analogy. The functions of the tools are explored in relation to the prehistoric recovery period in El Salvador following the Ilopango volcanic eruption. (11)

Zier, Christian J. (Colorado) JOYA DE CERÉN: A NON-ELITE DOMESTIC SITE IN THE ZAPOTITÁN BASIN, EL SALVADOR The Cerén site is a Classic period residential site, buried during its occupation by four to five meters of tephra ejected from a nearby volcano. A house—including standing walls and columns—was preserved, as was a nearby platform. An associated *milpa*, with casts of immature maize plants, was discovered near the structures. At least eight activities and/or activity areas may be postulated for the inhabitants of Cerén, owing largely to the unusual preservation: ceramic manufacture, food preparation, storage, child's play area, obsidian usage, refuse disposal, clay procurement, and agriculture. (11)

Zielinski, M. (Cambridge) SITE CATCHMENT ANALYSIS: ADVANCES IN THE METHOD APPLIED TO FINNISH DATA The paper considers criticisms leveled against catchment analysis at the practical and theoretical levels. To incorporate these criticisms, the function of the analysis is redefined. Three ways are proposed to render the method more powerful and comprehensive: introducing ecologically defined but culturally significant measures such as niche width; constructing predictive models of site location; comparing features of natural environment with those reflected in site catchments. Difficulties associated with extension of the analysis in these ways are discussed with reference to Forest Neolithic and Bronze Age sites in Finland, dated 4000-500 B.C. (23)

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Published quarterly by  
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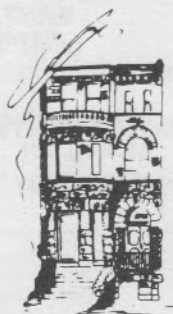
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